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ABSTRACT

The Technology and the Media section of the proceedings contains the following 18 papers: "What's Wrong with This Picture?: Attitudes of Photographic Editors at Daily Newspapers and Their Tolerance toward Digital Manipulation" (Shiela Reaves); "Strategies for the Analysis of Large-Scale Databases in Computer-Assisted Investigative Reporting" (Margaret H. DeFleur); "Advanced Promotion Technologies' 'Complete Promotion Delivery System': Is It a 'Leading Indicator' of Advertising and Sales Promotion Trends for the Nineties and Beyond?" (Barry M. Foskit); "Origins of the Garamond Style: The Roman Types of Simon de Colines" (Kay Amert); "New Imaging Technologies: Is the Print News Industry Adopting a Credibility Pandora's Box?" (Danal Terry); "Uses of Communication Technologies in America's Courtrooms" (Sherrie L. Wilson); "Commercial Database Use in the Newsroom" (Cynthia De Riemer); "Calling Up Cyberspace: On the Threshold of Telecommunications Research" (Richard H. Cutler); "The Effectiveness of Sidebar Graphics" (Douglas B. Ward); "The Application of Publication to New Information Transfer Technologies" (Elizabeth K. Viall); "Assessing the Impact of Microcomputers on Magazine Design" (Patsy Guenzel Watkins); "The Effects of Data Complexity and Display Efficiency on Time Spent Reading Statistical Information in Text, Tables, and Graphs" (James D. Kelly); "Technical and Policy Issues Concerning Access to the Geosynchronous Orbit and Radio Frequency Spectrum" (Ted Carlin); "Toward a Theory of Picture Editing and Use in Printed Publication" (John C. Peterson); "The Computerization of Television Newsrooms: A Case Study" (Richard C. L'Amie); "Facsimile Newspapers--A Changing Medium in a Changing Market" (Ray Laakaniemi); "Proceeding to Pagination: Ontario Newspaper Editors Assess New Technology" (Catherine McKercher); and "The Role of Telegraphy in the Development of Radio Sportscasting: The Case of Baseball" (J. Steven Smethers and Lee Jolliffe). (PRA)

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What's Wrong With This Picture?: Attitudes of Photographic Editors at Daily Newspapers and Their Tolerance toward Digital Manipulation

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"I weep for this industry"
— photo department manager, circ. 25-50,000

"A blessing and a curse!"
— photo department manager circ.10–25,000

"Bring on the computers!"
— photo editor, circ. 100-350,000

"Computer technology will either be the savior of photojournalism or its death. Only a strong commitment by photo editors and photographers will effect the outcome," wrote a photography director (circ. 100–350,000) in response to part of a national survey of photographic decision-makers at daily newspapers. A common theme among these editors was that while new computer editing technology increases the speed and ease of picture editing there were deep seated concerns about the possible abuses. This paper will examine the tolerance levels of 511 visual editors at daily newspapers toward digital manipulation of 15 photographs.

Computer technology presents a host of new ethical questions regarding photo editing that were not present with the traditional, mechanical technology prior to the mid-1980s. Traditional technology required both time and photographic skill to cause abuse with a negative, however new technology with a computer throws out the requirements of time, the darkroom, photographic skill — and with still video cameras, even the negative. Well-known and controversial examples of digital photographic manipulations have come mostly from the larger publications such as *National Geographic's* moving of the pyramids in 1982 and *TV Guide's* borrowing of Ann-Margret's body for an illustration of Oprah Winfrey in 1989 (*USA Today,* 1989). However newspapers have not been exempt, such as when the St. Louis *Post Dispatch* inadvertently removed a Diet Coke can electronically from the portrait of a 1989 Pulitzer Prize winner (*Editor and Publisher,* 1989). What do visual editors at daily newspapers think about specific kinds of computer editing changes? How much manipulation will visual editors tolerate? Is there a national consensus? The discussion of ethics has come largely from the elite press—larger newspapers that have been able to afford the expensive technology of systems like Scitex, Crosfield and Hell Graphics. However, this technology is no longer confined to the elite press and relatively inexpensive systems are coming to smaller circulation newspapers.

Literature Review

There has been research describing the computer technology and its impact on newspaper photojournalism (Reaves, 1987; Terry and Lasorsa, 1989). Fred Ritchin's important book, *In Our Own Image: The Coming Revolution in Photography,* also explored the future connection between electronic still photography and television video images. Several journalistic reports have also noted the ethical issues *(Wall Street Journal,* 1989; *Life* magazine, 1988; *San Jose Mercury News,* 1989;). In response to both the technical and ethical questions being raised, The National Press Photographers Association has sponsored two national electronic workshops on computer technology (*The Electronic Times,* 1989; 1990). Most observers have noted that ethical dilemmas can largely be confined when the price tag for the computers hover around $2 million. However, this technology is rapidly spreading to the personal computers like the Macintosh and many professionals are worried about the potential for greater abuse (Finberg and Itule, 1990). Digital photography is no longer an expensive technology; it is now part of off-the-shelf software like Adobe Photoshop (Martin, 1991).

In late November 1990 the Associated Press issued a written statement distributed to all AP photo personnel regarding the ethics of "electronic imaging" and photo content: "the content of a photograph will NEVER be changed or manipulated in any way" (*AP Log,* 1990). An unequivocal stand like AP's may be warranted in light of some fears among visual editors. In response to this survey, one assistant managing editor in charge of both features and graphics (circ. 100-350,000) commented:

> I find all of this terrifying. I am primarily a word editor, and I would not trust many editors to make the kinds of photo editing decisions you're discussing. Some layout editors here barely know how to crop a photograph, let alone alter it. In the wrong hands, this technology is dangerous. Readers think photos don't lie."

Method

As part of a study on new technology, 667 visual editors who influence photography at newspapers were mailed a questionnaire in November and December 1990. Editors were mailed surveys in early November and a follow-up postcard was sent ten days later. Editors who did not respond were sent a second, duplicate survey in early December and telephoned one week later with a request to return the survey.

The visual editors were identified from the *1990 Editor and Publisher International Yearbook*, which lists all editors as reported by the given newspaper. Position titles of editors chosen had to reflect an increased responsibility regarding photography that presumably would give greater access to picture editing discussions in the editorial meetings. These titles were photo editor, picture editor, assistant managing editor/graphics, director of photography, photo department manager, chief photographer, art director and graphics editor. All 667 editors listed by *Editor and Publisher* with those titles were included in the survey. "Staff photographers" were excluded since this title did not give a recognized level of photographic editing influence.

Response

Of the 667 visual newspaper editors surveyed, 511 responded for a response rate of 77%. An indication that the survey reached the photographic decision makers at the newspapers comes from the response to the question "What level of influence do you have in photo editing decisions on a day-to-day basis?" — almost 60% reported a "strong influence" while 32% reported "moderate influence." Only 7% reported "slight influence" and 1% reported "no influence."

Job titles varied between editors, however 57% of the editors were either "director of photography" or "photo department manager." A growing trend in the newsroom is having full-time picture editors and this is reflected by titles such as: "picture editors" for 23%; "graphics editor" for 10% and "assistant managing editor/Graphics" for 8%. Art directors accounted for about 2%.

These editors reported being experienced in their field — over 85% had a background as a working photojournalist and over 67% had over ten years experience in the newspaper field. Over 66% belonged to the National Press Photographers Association, the main forum for continuing professional development, and over 40% reported having attended two to three photo seminars in the last two years. Some of these demographic characteristics — including education, age, circulation, familiarity and use of computer technology — proved to be significant in predicting who would be more or less tolerant of digital manipulation.

Tolerance Towards Digital Editing of Photographs in 15 Visual Examples

As part of a part of the survey these editors were asked to look at a four-page visual insert that contained 15 different photographs altered on the computer. For eleven of the 15 questions there was a clearly marked original image and next to it was the altered image with a brief description of what element was altered. Editors did not have to guess what had been changed on the computer; they were clearly given the change plus a brief reason in an attempt to give some context. The editor was asked, "Do you agree with the computer editing change?" A five-point scale recorded the reaction from "Strongly Agree" to "Strongly Disagree." Of the 15 visual examples, five were photographic situations (in either color or B&W), where content elements were moved or removed. Six of the 15 visual examples were of technical alterations including both traditional alterations (such as burning & dodging) and newer technical changes (such as extending a border by cloning). Four of the examples combined photos or had more extensive alterations.

Many editors were alarmed by the possible changes allowed on a computer shown in the questionnaire. One photo editor (circ. 100-350,000) was "stunned and amazed" and asked, "Are the kids at your college being taught that doing some of this (manipulation) is OK just as long as they don't 'go to extremes'? Lord, I hope not." One photo department manager (circ. 50-100,00) reported, "I have photo-copied the survey and distributed this to all the editors who handle photos at our newspaper, to get a feel of where everyone stands on editing. The (newspaper) will have this technology within a year and the results of this survey (national and local) will help guide policies." One chief photographer (circ. 10-25,000) showed the visual examples to others with mixed reactions: "I took this survey to a class (adult photojournalism) I teach. They thought that it was all right to make all the changes that were in the first (visual) section. I also asked our managing editor and graphics editor, they felt all the changes were unethical." Another photo department manager (circ. 25-50,000) reported, "This survey/study is prompting development of a written code of standards and ethics."

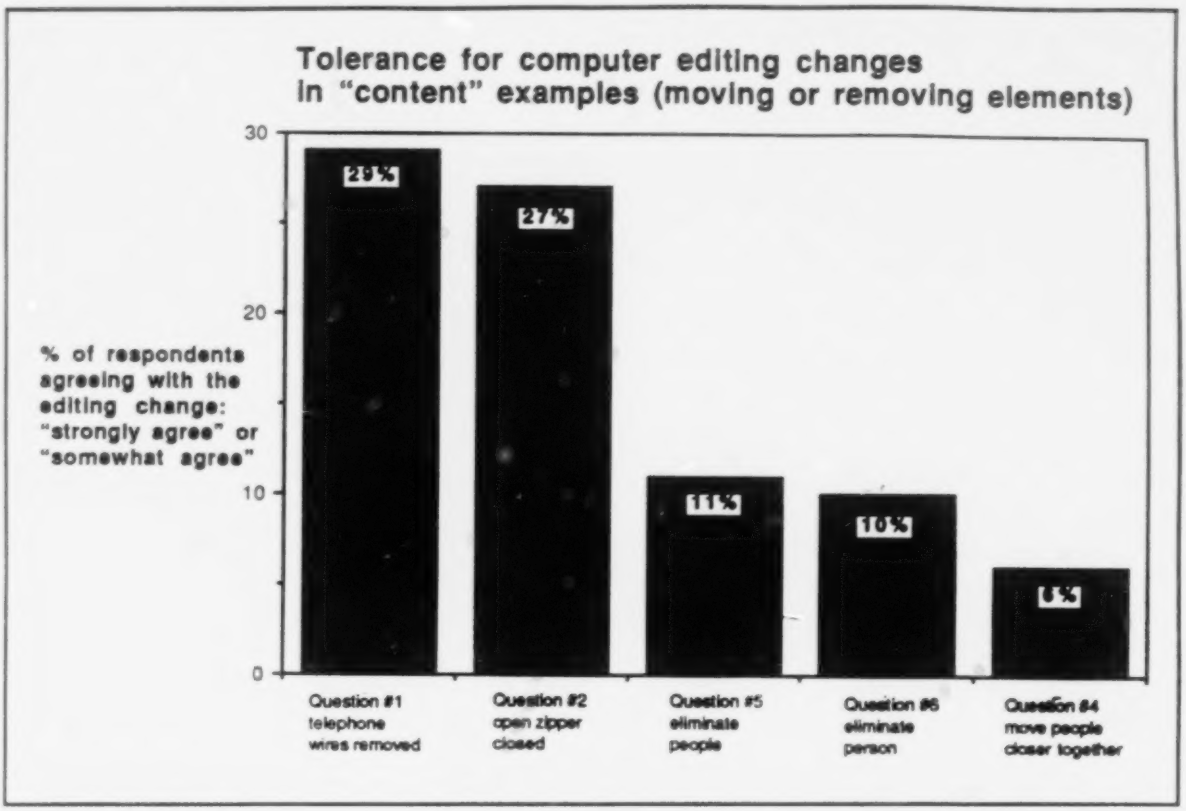
Two versions of the questionnaire were distributed — half of the editors were told that the first 11 visual examples were "news" photos while the other version identified the photos as "feature." For the remaining four examples containing combined photos, half of the questionnaires identified them as "magazine covers" while half of the questionnaires did not. Apparently this verbal context did not affect attitudes toward digital alteration. T-tests of the individual questions showed little variance in means between the groups who were given the "news" or "feature" version of the questionnaire. Also there was no significant difference in means when the subgroups of questions (content, technical and combination) were totaled individually.

Ranking of Tolerance for Digital Alteration of Individual Photos

Content Changes: Moving or Removing Elements

Although the photos described fairly diverse content changes, visual editors answered them with a good degree of internal consistency. The five individual photos were summed into a scale with a satisfactory level of reliability (alpha=.85). Perhaps one of the biggest temptations in the new computer technology is the desire to clean up a photograph that appears cluttered or messy. Some photographers have argued that it's OK because small elements are "journalistically irrelevant." (*News Photographer,* 1989). Although airbrushing has been available for decades, it has always remained a mechanical process that required some skill. The computer allows access to airbrushing by anyone capable of turning on the computer. If visual editors could move or remove "distracting" or "unimportant" elements, would they want to?

Of the five visual examples of computer editing changes in "content," a majority of the editors "strongly disagreed" with each of the five decisions. At the same time there were different levels of tolerance for the computer editing decisions in the five situations. Agreement with the computer editing changes ("strongly agree" or "somewhat agree") ranged from 29% to 6%.



Tolerance for computer editing changes in "content" examples (moving or removing elements)

Photo #1 (see appendix – a color photo of women dressed as the American flag had telephone wires running behind their heads.) Question: "This photo was edited to eliminate distracting telephone wires. Do you agree with the computer editing change?"

Strongly Agree: 9.2%; Somewhat Agree: 20%; No Opinion 1%; Somewhat Disagree: 14.9%; Strongly Disagree: 54.8%.

Photo #2 (see appendix – a color photo of boy whose zipper is unzipped.)

Question: "This photo was edited to close a boy's open zipper to avoid potential embarrassment to the boy. Do you agree with the computer editing change?"

Strongly Agree: 9.4%; Somewhat Agree: 17.7%; No Opinion 1.8%; Somewhat

Disagree: 20.2%; Strongly Disagree: 50.9%.

Photo #4 (see appendix – a B&W photo of a farmer between two boys and two oxen.) Question: "This photo was edited to move subjects closer together to make the photo fit a layout. Do you agree with the computer editing change?"

Strongly Agree: 1.6%; Somewhat Agree: 4.5%; No Opinion .4%; Somewhat Disagree: 7.7%; Strongly Disagree: 85.8%.

Photo # 5 (see appendix – a B&W photo of a very large outdoor sculpture with the smaller figures of three people.) Question: "This photo was edited to eliminate the people for graphic effect. Do you agree with the computer editing change?"

Strongly Agree: 3.3%; Somewhat Agree: 7.5%; No Opinion 2.4%; Somewhat Disagree: 10.6%; Strongly Disagree: 76.2%.

Photo #6 (see appendix – a B&W photo of two soldiers on a bicycle with a passerby in the background.) Question: "This photo was edited to eliminate a person in the background to make the background less distracting. Do you agree with the computer editing change?"

Strongly Agree: 2.6%; Somewhat Agree: 7.1%; No Opinion 1.4%; Somewhat Disagree: 10.8%; Strongly Disagree: 78.1%.

Discussion of Content Changes

The area of aesthetics — ie, "cleaning up a photo" — is perhaps one of the greatest entry points for tolerating digital alteration on the computer. Although this was easily available with airbrushing, it was not built into the darkroom process and it required time and skill. Computer technology is, in effect, a giant airbrushing machine and easily learned and controlled by anyone with access to the computer. The majority of visual editors at newspapers (54.8%) would strongly disagree with removing the telephone wires however distracting to the editor.

But what if a digital alteration protects the feelings of the subject? The editors who digitally closed a boy's open zipper were acting with sensitivity to the boy, which is laudable. Closing zippers is easily done on the computer, and editors must decide where their loyalty lies — with the subject's feelings or with the original negative. But the question still remains, how far should a news editor go? Half of the visual editors strongly disagreed with closing the zipper (50.9%.) Were there other options besides choosing another frame? "Purists" and "hardliners" might have suggested to crop at the waist, despite any aesthetic arguments that it looked clumsy.

The ability to seamlessly remove excess space between subjects is new — and strongly rejected by visual editors in this particular case (85.8% strongly disagreed). However, editors should be aware that removing space is another entry point to tolerating digital manipulation. Two of the biggest examples of manipulating photos was due to a horizontal photo chosen to fit into a vertical format. *National Geographic* moved a pyramid to fit a vertical cover and the documentary book, *A Day in the LIfe of America,* moved a cowboy closer to the moon to fit the vertical cover.

Removing people, whether they were small figures or background passersby, offended these visual editors. One photo of a large sculpture, without apparent news value, had 76% of the editors strongly disagreeing. Another photo of two soldiers, which had a more newsworthy appeal than the statue, evoked 78% of the editors to strongly disagree removing the passerby.

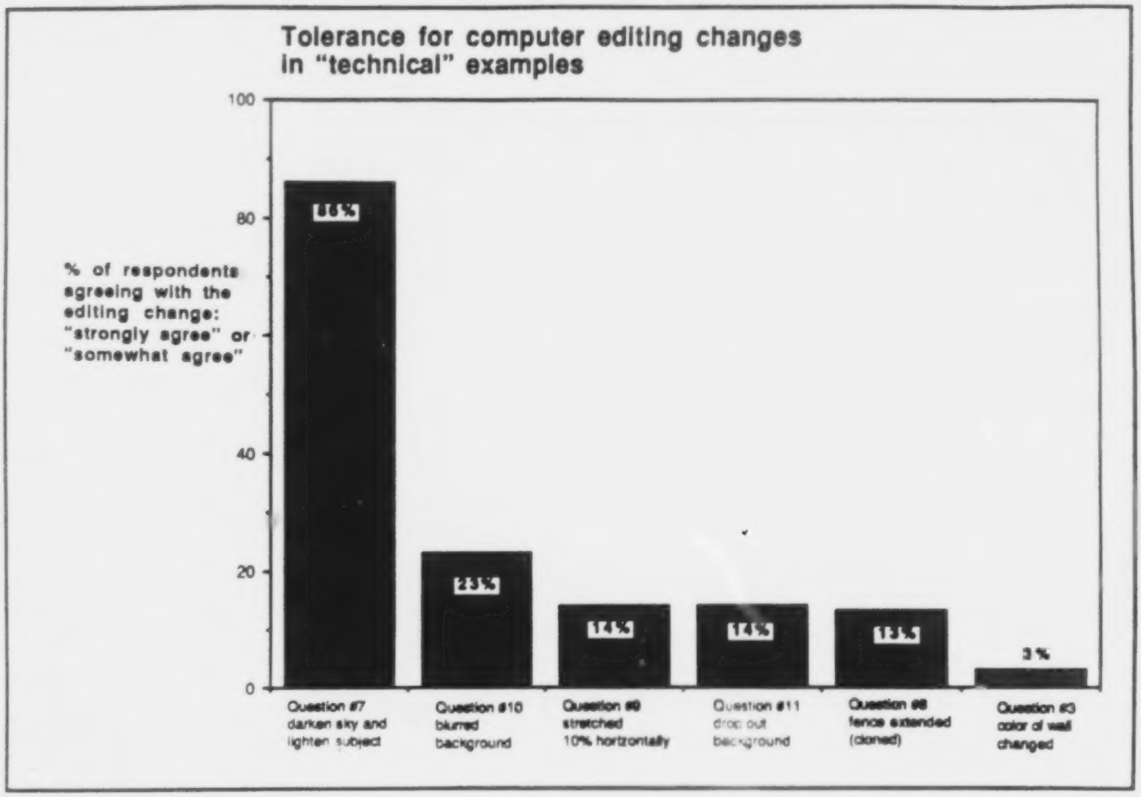
Comments from the Editors about Changing Content

Many editors discussed the potential loss of credibility when making content changes. One photo editor (circ. 50-100,000) echoed many other editors when he said, "Why not change the quotes in a reporter's story to make it better? No way!! You just don't. When readers learn that you electronically alter photos then your papers/magazines lose credibility. Losing your credibility makes you worthless." One managing editor/graphics (circ. 100-350,000) said, "I think it is important that we remember we are in the business of freezing moments in time — warts and all. If we begin altering those moments we loose all credibility." One photo department manager (circ. 10-25,000) recognized the metaphor of painting: "We still need to realize that as photographers we are photographing life — not painting in news and feature photos." One director of photography (circ. 100-350,000) embraced the messiness that the camera records: "The negative and photo have an indifferent truthfulness in them that should be respected." Regardless of the quality and value of any particular photo, one assistant managing editor/graphics (circ. 100-350,000) warned, "To alter the recorded physical aspects of a documentary picture (no matter how seemingly insignificant) is to alter the documentary truth of that image. To authenticity and believability of all documentary pictures. This further undermines the reader's basic trust of newspapers, something we can't afford to have happen. The reader's trust is our lifeline."

Technical Changes: Traditional Editing vs. New Ability with the Computer

Six of the visual examples were technical in nature such as the traditional use of lightening and darkening parts of the print for better reproduction ("burning and dodging"). However computer technology allows new changes that are very subtle. Are visual editors more likely to tolerate specific changes if they appear to be technical? One black and white photo was used for five of the questions, however, the techniques varied widely. Although the six photos showed different techniques, editors answered them with a fair degree of internal consistency (alpha=.74).

Five of the six technical changes used the same original B&W portrait for making computer changes. Except for burning and dodging a print, the majority of editors disagreed with these technical changes. The sixth photo was color. Agreement with these technical changes ranged from 86% to 2.8%.



Tolerance for computer editing changes in "technical" examples

Photo #3 (see appendix – a color photo of a woman looking out from a window.) Question: "This photo was edited to change the color of the wall to better match other colors in a page layout. Do you agree with the computer editing change?"

Strongly Agree: 1.0%; Somewhat Agree: 1.8%; No Opinion .6%; Somewhat Disagree: 9.3%; Strongly Disagree: 87.4%

Visual examples #7 thru #11 all relate to one original portrait (see appendix – a B&W portrait of a man by a fence with a house behind him.)

Photo #7. Question: "This photo was edited to darken the sky and lighten the subject. Do you agree with the computer editing change?"

Strongly Agree: 45.9%; Somewhat Agree: 40.4%; No Opinion 3.7%; Somewhat Disagree: 6.1%; Strongly Disagree: 3.9%.

Photo #8 Question: "This photo was edited to so that the border of the photo (fence) was extended (by cloning) to fit a layout. Do you agree with the computer editing change?"

Strongly Agree: 3.7%; Somewhat Agree: 9.4%; No Opinion 5.3%; Somewhat Disagree: 18.5%; Strongly Disagree: 63.1%.

Photo #9 Question: "This photo was edited to stretch the photo 10% (horizontally) to fit a layout. Do you agree with the computer editing change?"

Strongly Agree: 3.1%; Somewhat Agree: 10.6%; No Opinion 4.9%; Somewhat Disagree: 17.9%; Strongly Disagree: 63.4%.

Photo #10 Question: "This photo was edited to blur the background to emphasize the subject. Do you agree with the computer editing change?"

Strongly Agree: 4.7%; Somewhat Agree: 18.6%; No Opinion 4.5%; Somewhat Disagree: 21.6%; Strongly Disagree: 50.6%.

Photo #11 Question: "This photo was edited to drop out the background for graphic effect. Do you agree with the computer editing change?"

Strongly Agree: 3.3%; Somewhat Agree: 10.2%; No Opinion 3.9%; Somewhat Disagree: 15.9%; Strongly Disagree: 66.6%.

Discussion of Technical Changes

What if the photographer uses a color filter to dramatically change the color of a scene? Isn't it the same as when an editor does it on the computer? Apparently not. This particular color change of a portrait was overwhelming rejected by visual editors (87.4% disagreed).

Perhaps the most important technical question was a control question to test a possible phobia about computers in general. Since "burning and dodging" is the one of the most accepted darkroom practices, there was no reason to expect editors to object to its use on computers. With 86% agreeing, this was the most accepted alteration allowed in this survey.

Cloning, duplicating elements or else extending the border of a photo, is a completely new technical change offered by the computer. Several visual editors have admitted, off the record, that they use this to fit pictures into news holes. However, this was not approved for cloning the fence of this portrait (63.1% strongly disagreed). It is an entry point for allowing digital alteration of photos and is popular among editors who are design oriented.

Stretching a photo is another revolutionary change that the computer offers, which in effect changes a photograph into controlled liquid that can stretch and distort an image. Visual editors did not approve of this in the portrait, and it should be pointed out that the stretching appeared to "fatten up" this thin subject. Stretching is undetectable when done at small percentages, however, gross distortion is easy at larger percentages.

Photographers make decisions about sharpness and depth of field with every assignment. What is the harm about doing it on the computer? For this portrait, the visual editors did not approve (50.6% strongly disagreed).

Dropping out the background was an important control question since it is commonly done by traditional means. However, this practice is often controversial among professionals who say it demeans photography by turning it into an illustration such as in business-section portraits. The disapproval by visual editors in this particular photo should not be interpreted as necessarily being anti-computer.

Comments from Editors about Technical Changes

A photo editor from one of the pioneering newspaper editors in this technology, (circ. over 750,000) said, "I feel very strongly that the use of Scitex equipment should only do with pictures what we have done by traditional means." One graphics editor (circ. 350-750,000) said, "Although photographers and photo editors should be the best keepers of electronic editing technology, I've seen them commit some of the worst technical abuses in the pursuit of perfection. What wasn't perfect in the field can now be made perfect in the machine. A very dangerous temptation." One picture editor (circ. 10-25,000) said, "I believe that a picture should not be edited any more than would be possible through traditional techniques, ie, dodging, burning or cropping. If it can't be done in the darkroom then it shouldn't be done on the computer (for news, spot news, sports or feature pictures)." What these visual editors are recognizing is that the computer offers a continuum of digital alterations — and the time to stop is in the beginning. As one assistant managing editor/graphics (circ. 350-750,000) advises, "I know how to and have trained Scitex operators. It is very important from the beginning to stress "no manipulation" of digital images — just because a computer is capable of change doesn't mean it has to be used."

Combination Photos and Extensive Alterations

What about combining photographs for illustrations or portraits? What about extensive manipulation of a news photo? The last four visual examples were taken from case studies in magazines. Three of the four examples involved cover photographs and so the photo in part reflected the editorial format of the magazine. Half of the editors were told that the photos were magazine covers while the other half were not given any designation. Analysis of the means between the verbal context (magazine cover vs. no listing) did not show a significant variance except for one question that will be discussed later. Although this subgroup asked about different kinds of changes, the responses were fairly consistent (alpha=.72). Agreement for the changes (strongly to somewhat agree) varied from 2% to 19.5%.

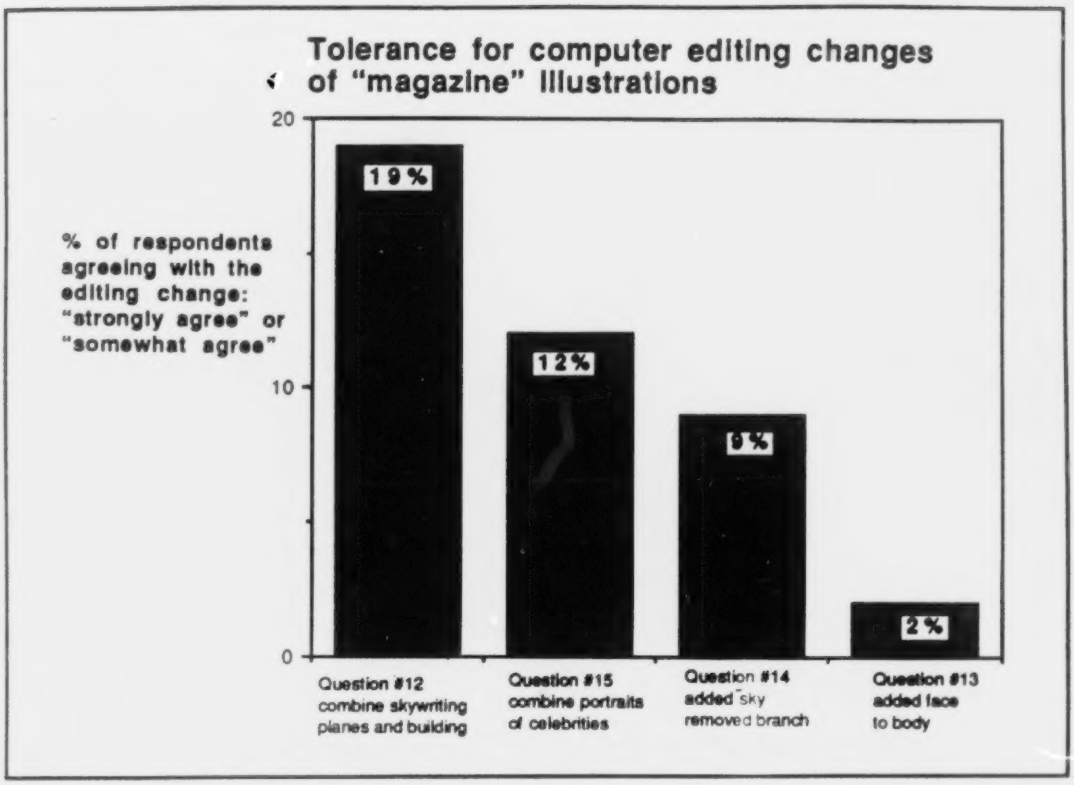


Photo #12 (see appendix— a color photo of three planes skywriting the words "New York" over the Chrysler Building)

Question: For a photo, three images were combined: skywriting planes, the Chrysler Building, and the words "New York." Do you agree with the computer editing changes?

Strongly Agree: 4.3%; Somewhat agree: 15.2; No Opinion: 8.7%; Somewhat Disagree: 14.8%; Strongly Disagree: 57%.

Photo #13 (see appendix— a picture of smiling Donald Trump in a tuxedo gesturing with his thumbs up)

Question: For a photo a celebrity's face was combined with a photo of a posed model's body (because the celebrity would not pose for a portrait). Do you agree with the computer editing changes?

Strongly Agree: .8%; Somewhat agree: 1.6; No Opinion: 1.6%; Somewhat Disagree: 4.3%; Strongly Disagree: 91.7%.

Photo #14 (see appendix— a color photo of a soldier with a machine gun)

Question: For a photo the blue color of the sky was intensified, clouds were added and a tree branch was removed. Do you agree with the computer editing changes?

Strongly Agree:2.6%; Somewhat agree: 6.5%; No Opinion: 3.3%; Somewhat Disagree: 14.4%; Strongly Disagree: 73.2%.

Photo #15 (see appendix— a color photo of *Rainman* stars, Dustin Hoffman and Tom Cruise leaning next to each other)

Question: For a portrait, separate photos of two celebrities were combined (because the two celebrities could not pose at the same time). Do you agree with the computer editing changes?

Strongly Agree:2.6%; Somewhat agree: 6.5%; No Opinion: 3.3%; Somewhat Disagree: 14.4%; Strongly Disagree: 73.2%.

Discussion of Combination Photos

Half of the photographic editors were given surveys that designated these four photos as being for magazines — three magazine covers and one magazine portrait. T-test revealed that there was no difference in mean scores between this verbal context (magazine vs no listing) except for question 12 of the skywriting planes and a New York City building. Photographic editors were more tolerant of this combination photo when told it was for a magazine cover (mean score was 3.7) than those editors who were not given a location designation (mean score was 4.3); ($t=-5.47$; $df=476.68$; $p<.001$). The New York illustration was the only photo combination that did not contain people. A crosstab shows the different responses from editors depending on whether they were given the designation "magazine cover " or no listing ($x^2=43.82$; $df=4$; $p<.001$).

TWO VERSIONS OF QUESTION #12:

Version A– "For a magazine cover, three images were combined: skywriting planes, the Empire State Building, and the words 'New York.'
Do you agree with the editing change?"

Version B– "Three images were combined: skywriting planes, the Empire State Building, and the words 'New York.'
Do you agree with the editing change?"

	STRONGLY AGREE 1	SOMEWHAT AGREE 2	NO OPINION 3	SOMEWHAT DISAGRE 4	STRONGLY DISAGRE 5	Row Total
"MAGAZINE"	20 7.8	53 20.5	17 6.6	49 19.0	119 46.1	258 50.9
NO LISTING	2 .8	24 9.6	27 10.8	26 10.4	170 68.3	249 49.1
Column Total	22 4.3	77 15.2	44 8.7	75 14.8	289 57.0	507 100.0

On the other hand, visual editors strongly rejected the combination photo of Donald Trump and a model's body despite the fact that one-half of the editors were told it was for a magazine cover (over 91% strongly disagreed). This cover was originally on a satirical magazine, however, the strong reaction from editors may have come in light of the earlier Oprah Winfrey controversy. Moreover, pasting a head onto someone else's body is a technique of the tabloid papers, which also may affect the editors' response.

One of the major entry points for altering photographs is when the photo appears on a magazine cover. Because of the competition for newsstand sales, the cover photo should excel in both content and technical areas (Reaves, 1989; Quigley, 1987). Many editors commented that they would never alter a news photo, however over 9% agreed to alter the cover photo of a soldier with his machine gun and 3% had no opinion.

Combining portraits of people who either cannot or did not appear together is another major entry point for digital alteration. In traditional technology this cutting and pasting is popular among the tabloids, however traditional technology was limited in controlling differences in lighting, lens perspective and sizes of people. New computer technology makes combining photos of two people easier and seamless. But what if you get the people's permission to combine their photos? Doesn't that let the editor off the hook? The portrait of the *Rainman* stars Hoffman and Cruise originally appeared in a news magazine and was later reprinted in *In Our Own image*, where Ritchin criticized it for transcontinental combining. This picture was the only photo that had enough publicity beforehand to prompt a response that may have been postured. However, the question of combining portraits *with the subjects' permission* was considered too important. It is interesting to note that almost 12% agreed to the combination while almost 6% had no opinion, which is an indication that they might have been talked into it. Despite the subjects' permission, 70% of the photographic editors strongly disagreed. A photographic editor from the magazine that originally combined Hoffman and Cruise commented, "The picture of Tom Cruise and Dustin Hoffman appeared, to my chagrin, in (the magazine) just prior to my holding this job. Since this has occurred our editors are very much more aware of the latest problems in this field and our policy has solidified to prevent its recurrence. Hoffman and Cruise today. Abu Nidal and the Pope tomorrow."

Who Is More Tolerant of Digital Manipulation?

In general, these 511 photographic editors were very critical of any kind of digital manipulation. Except for the traditional practice of printing, "burning and dodging," these visual editors at newspapers were strongly intolerant of digital manipulation of the 15 specific photo examples. At least 50% of these editors consistently "strongly disagreed" with all 14 examples of digital manipulation.

Nevertheless, the fact remains that some photographic editors did agree to some of these changes. Who were the editors more tolerant of digital alteration? Analysis of total mean scores and also subgroup scores (content, technical, combination) reveals that editors differed in attitudes toward digital manipulation depending on certain demographic characteristics. A score of 75 would indicate the strongest intolerance level possible for all 15 questions (consistently "strongly disagreed").

Circulation

There was a difference in attitude toward digital manipulation across all 15 questions between daily newspapers that fell below 100,000 circulation. Editors at newspapers with circulations over 100,000 were less tolerant (t=5.9; df=415.38; p<.001). The total mean score for editors over 100,000 circulation was 66.3 while the mean score for editors under 100,000 circulation was 61.3. This significance remained consistent when looking at the subgroup categories of content, technical and combination manipulation (p<.001). One photo department manager (10-25,000) commented, "I feel once the door is opened, no one will be able to shut it. In a small market such as this, editors are not schooled in ethics. So, electronics editing will be abused, and photojournalists credibility will suffer." Another photo department manager (circ. 25-50,000) wrote, "Departments all over the company are arguing that they need to be able to edit or alter photos. We have a battle started and we have no equipment yet."

Familiarity with the Technology

Editors who were familiar with the computer technology of Scitex, Crosfield or Hell Graphics systems were more intolerant of digital manipulation than those editors who were unfamiliar (t=6.46; df=236.17; p<.001). The total mean score for editors who reported being " very," "moderately" or "slightly" familiar was 64.9 while the mean score for editors who reported being "unfamiliar" was 58.1. This significance remained consistent at the subgroup categories (p<.001). One photo department manager (circ. 10-25,000) was concerned about the Associated Press' role in spreading digital technology: "AP is bringing all newspapers into this technology so swiftly that individual newspapers haven't developed a policy (in advance)."

Background in Photojournalism

Editors who possessed a background as a working photojournalist were less tolerant toward digital manipulation (t=3.77; df=85.65; p<.001). The total mean score for editors who had a photojournalism background was 63.8 while the non-photojournalists had a mean score of 58.1. The significance remained consistent at the subgroup questions involving technical changes, however the significance changed slightly in content subgroup (p<.01) and combination subgroup (combination, p<.01). Photojournalists may have a clearer grasp of technical implications than non-photojournalists. One chief photographer (circ. 50-100,000) voiced concern about non-photojournalists, "Because verbal/non-visual editors will be doing a great deal of this work, particularly at smaller papers, it is important that they be kept in (the) educational loop right from the start of the use of new technology."

Influence in Photo Editing

Editors who reported a "strong influence" in day-to-day picture editing were less tolerant of digital manipulation than those visual editors who reported a "moderate," "slight," or "no" influence in picture editing (t=-3.8; df=368.87; p<.001). The total mean score for visual editors who reported a strong influence was 64.3 while the mean score for editors who reported less influence was 60.6. This significance remained consistent in the subgroup questions involving technical changes, however changed slightly in content (p<.01) and combination subgroups (p<.01).

NPPA Membership and Professional Development

Those visual editors who reported a higher level of professional activity — such as going to at least one photo seminar in the last two years or being a member of the National Press Photographers Association — differed significantly in attitudes toward digital manipulation. Visual editors who belonged to NPPA, the dominant national organization in newspaper photojournalism, were more intolerant of digital manipulation (t=-6.96; df=213.93;p<.001). The total mean score for NPPA members was 65.3 while the mean score for non-members was 57.7. This significance remained for subgroups. Visual editors who had attended at least one photo seminar in the past two years were also more intolerant to digital manipulation than their inactive counterparts (t=5.62; df=147.14; p<.001). The total mean score for editors who attended one photo seminar in the past two years was 64.5 while the inactive editors had a mean score of 57.3. This significance remained consistent for subgroups.

Education, Age and Gender

It is interesting to note that experience — "years in the field" — did not seem to affect attitudes toward digital manipulation. Gender was also not a variable, and it is interesting to note that men accounted for 89% of the visual editors who responded (N=667).

However, education and age did have an effect in attitudes toward digital manipulation. Visual editors who possessed a college or graduate degree were less tolerant toward digital alteration (t=2.79; df=229.66; p<.01). The mean score for these editors was 63.7 while the editors who reported "some college" or "high school" had a mean score of 60.7. Visual editors who were 35 years or under were less tolerant toward digital alteration (t=-2.13; df=456.15; p<.05). The mean score for these editors was 64.0 while the mean score for editors 35 and older was 62.1.

Conclusions

Patterson and Wilkins (1991, p. 175-76) have observed that there is an "ethical dichotomy" emerging between editing words and pictures on the computer. A writer is praised for reworking words, however, when a photographer rearranges reality it is called staging and when a computer editor rearranges visual elements it is called distortion." Patterson and Wilkins recognize this as a critical difference between words and pictures: "We evaluate news according to print standards: linear and logical. Video and photography are neither. They have a quality Marshall McLuhan called "allatonceness." Editors should become aware of this ethical dichotomy.

Perhaps the ultimate difference of photography is that, unlike words, a photo is a *chemical* record of original lightwaves that emanated from a subject from a moment in time. A photograph may be a symbol, like words, but it is a symbol that has a chemical memory about where it came from: the physical reaction of light captured on film. Visual editors at newspapers appear very unwilling to treat photographs like pliable words or artistic paintings.

There is a firm and conservative consensus among these 511 photographic editors concerning 15 specific photographic examples of digital manipulation. These visual editors were largely intolerant to manipulation with the overwhelming majority disagreeing with anything beyond "burning and dodging" (darkening and lightening of a print). Although gender and job experience did not affect tolerance toward digital manipulation, there is a pattern among those editors who did have a higher tolerance. Among the attributes were: less familiarity with the technology; circulation under

100,000; no background in photojournalism; lower level of professional activity; less college education; older than 35; less influence in day-to-day editing.

How should editors handle digital technology? The most specific advice that expresses the consensus of these 511 visual editors comes from one director of photography (circ. 350-750,000) who uses the high-tech computers: "The philosophy at our newspaper is not to publish any image which we cannot produce in negative form. Thus, the only manipulation is lightening/darkening, boosting the colors, dodging/burning and spotting scratches and dust spots. No cloning pixels. No moving elements. No combining different negatives. NO sanitizing images after the shutter has clicked (telephone wires/open zippers). That is the photographer's initial responsibility and (the) photo editor's second. Pick another frame!"

Educators and organizations like NPPA should be encouraged to share what they know about digital manipulation. Educators can work to reach the potential visual and verbal editors and avoid the fear of one director of photography (circ. 25-50,000): "The age of electronics will make some photographers lazy. Now what you see is what you get. You must watch and balance subject, light, and background to get 'the ' shot. With digital technology, you could get 'the' shot by being a better 'computer editor' than photographer." In the age of digital manipulation photographers and editors may find a new appreciation for the rawness of unmanipulated photojournalism. "What's wrong with this picture?" may become a question applied to images that are too tidy, pristine and digitally perfect.

###

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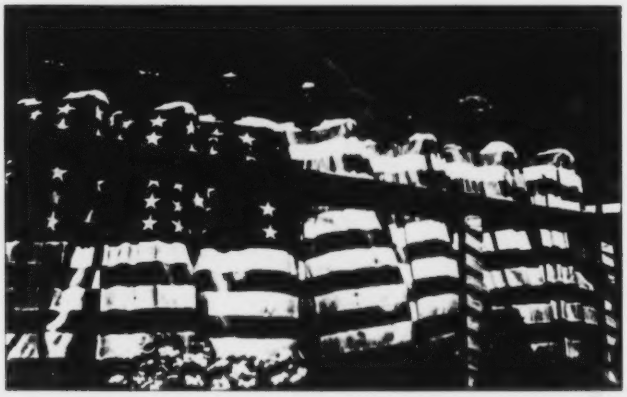
Section A, Visual Examples: computer editing of photographs.

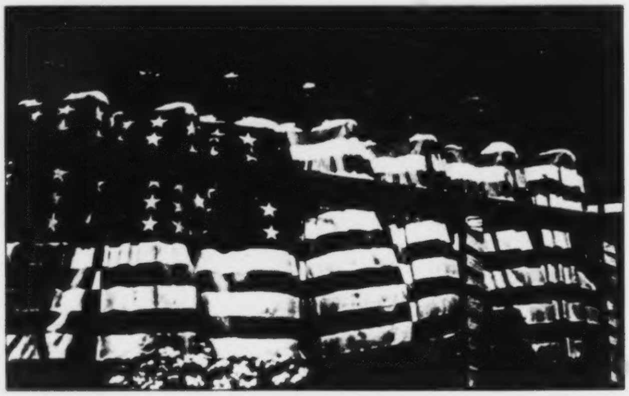
Please refer to this insert when answering questions 1 thru 15, Section A.

#1. Photo was edited to eliminate telephone wires.

#1 Original

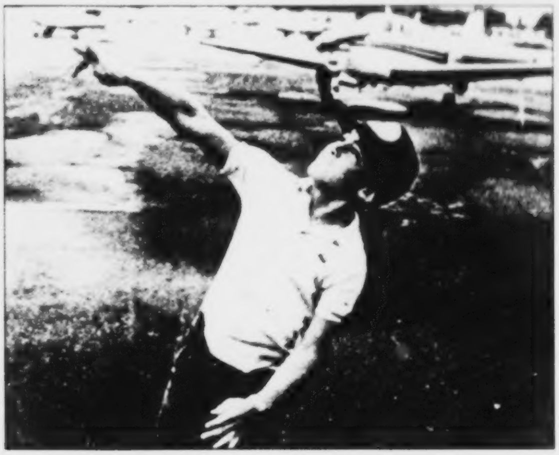


#1 Edited

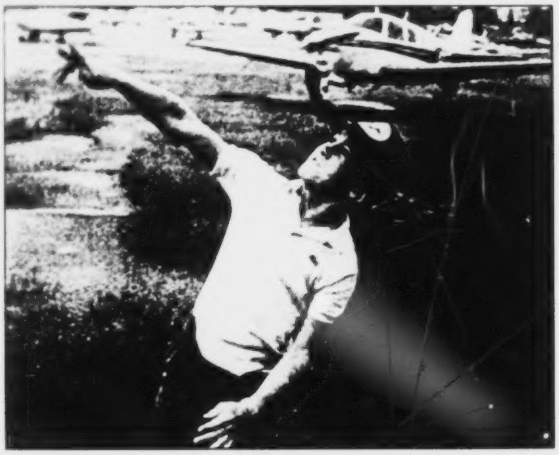


#2.Photo was edited to close a boy's open zipper.

#2 Original

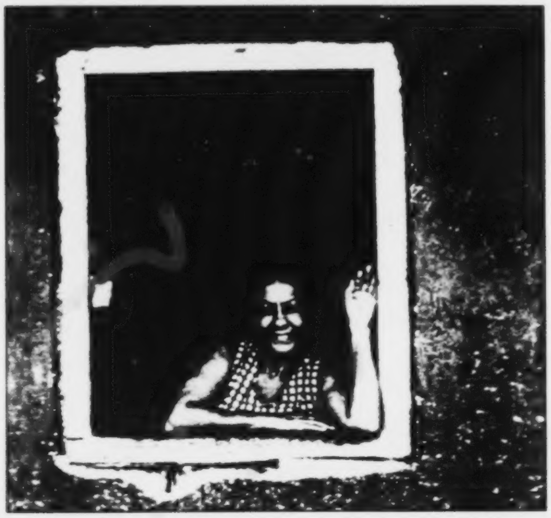


#2 Edited

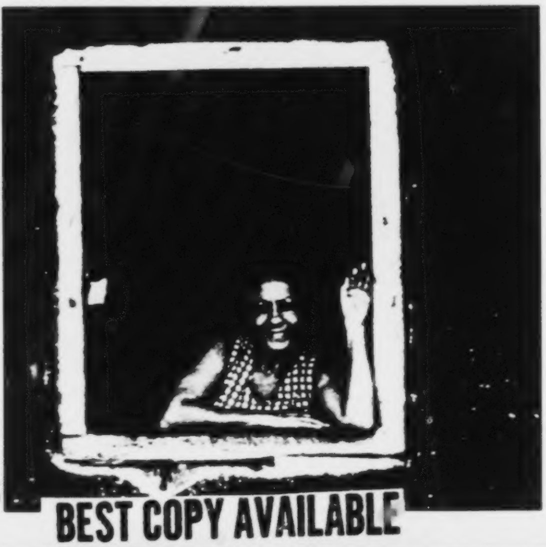


#3. Photo was edited to change the color of the wall.

#3 Original



#3 Edited



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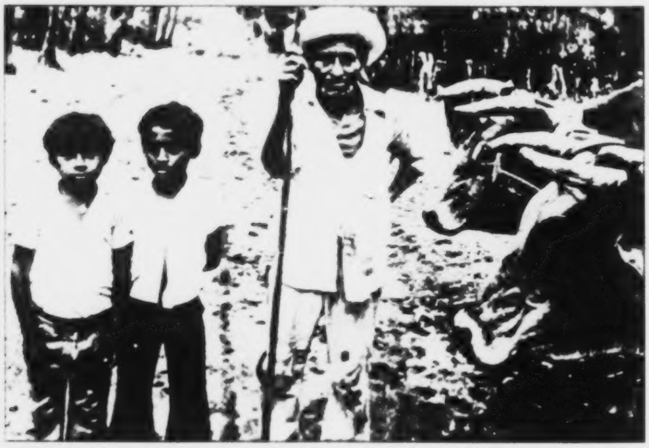
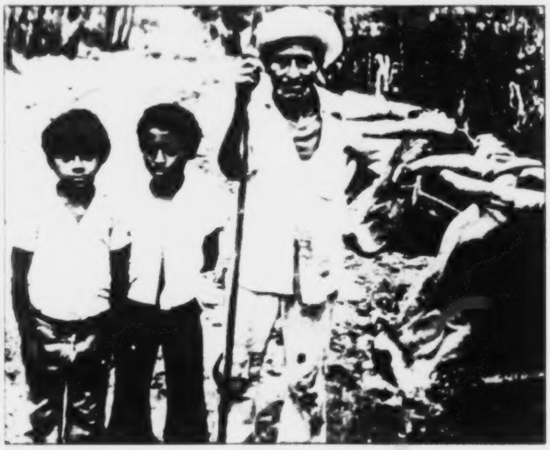
Please refer to this insert when answering questions 1 thru 15.

#4. Photo was edited to move subjects closer together.

#4 Original

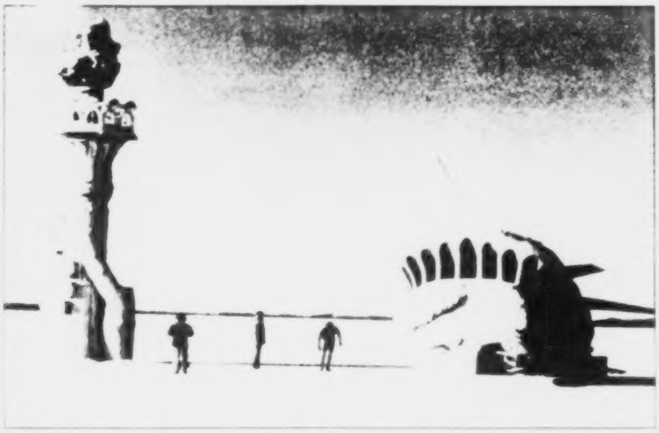


#4 Edited

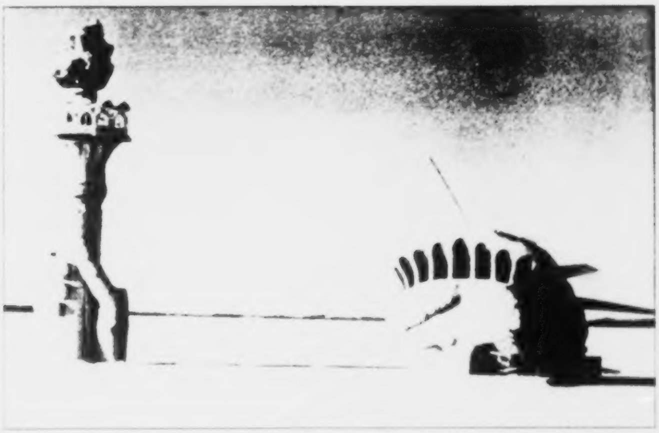


#5. Photo was edited to eliminate the people.

#5 Original

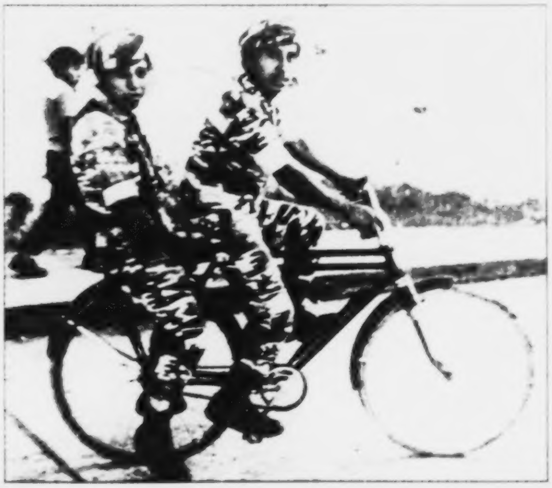


#5 Edited

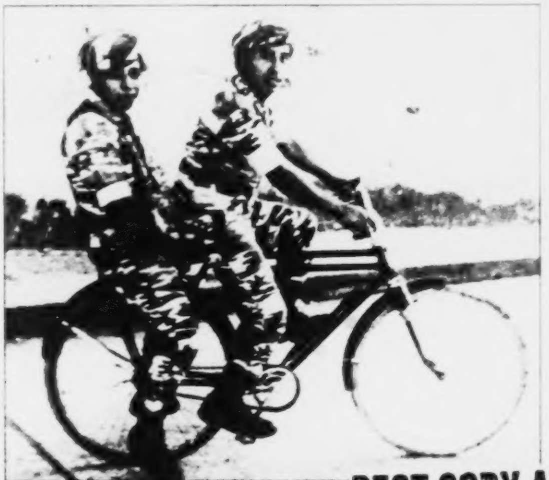


#6. Photo was edited to eliminate a person in the background.

#6 Original



#6 Edited



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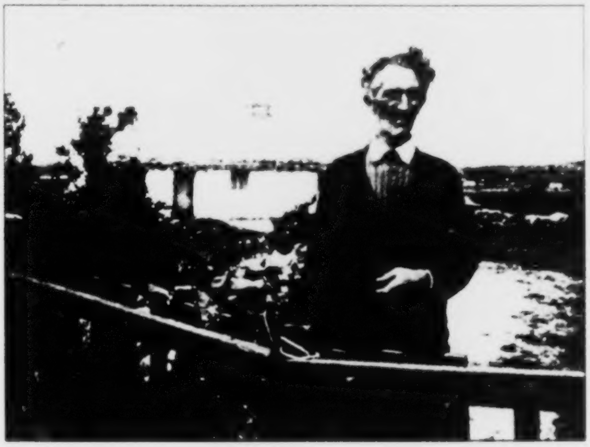
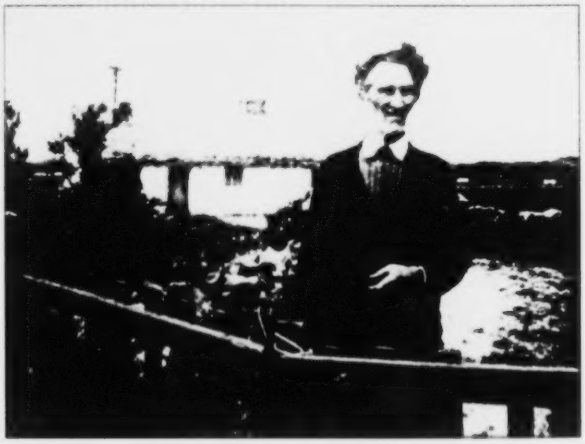
Please refer to this insert when answering questions 1 thru 15.

Questions 7 thru 11 deal with a series of computer editing changes based on one original

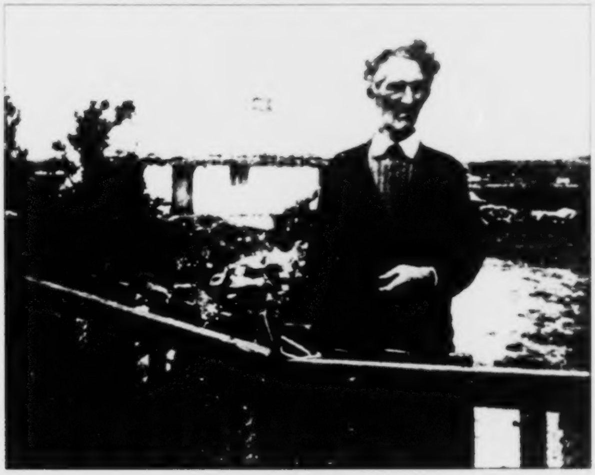
Original for #7 thru #11



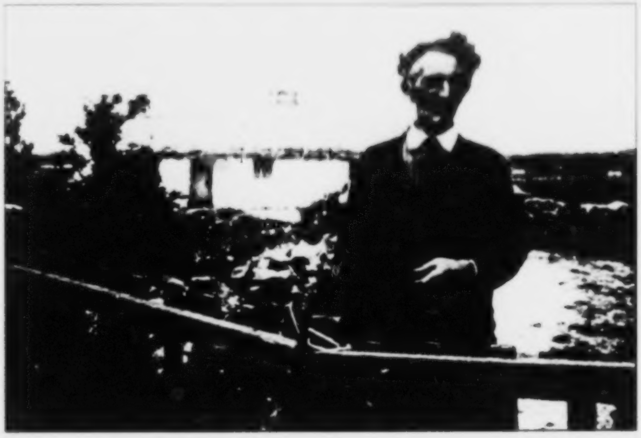
#7 Sky was darkened and subject lightened.



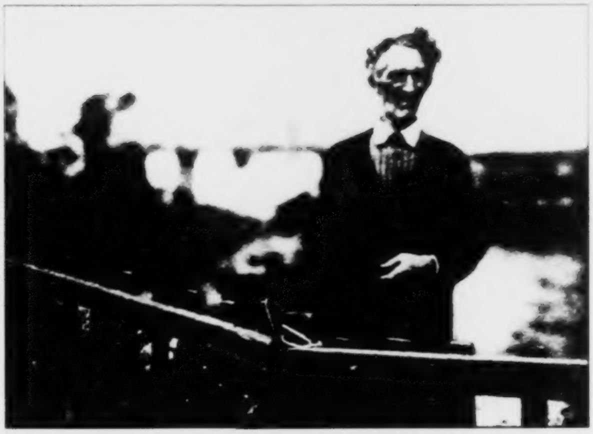
#8 Lower border was extended (by cloning the fence).



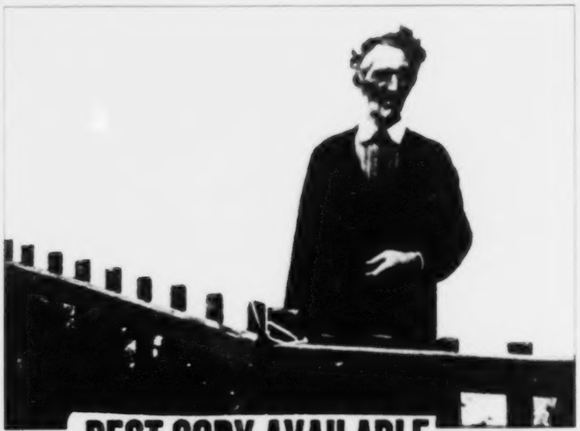
#9 Photo was stretched 10% horizontally.



#10 Background was blurred.



#11 Background was dropped out.



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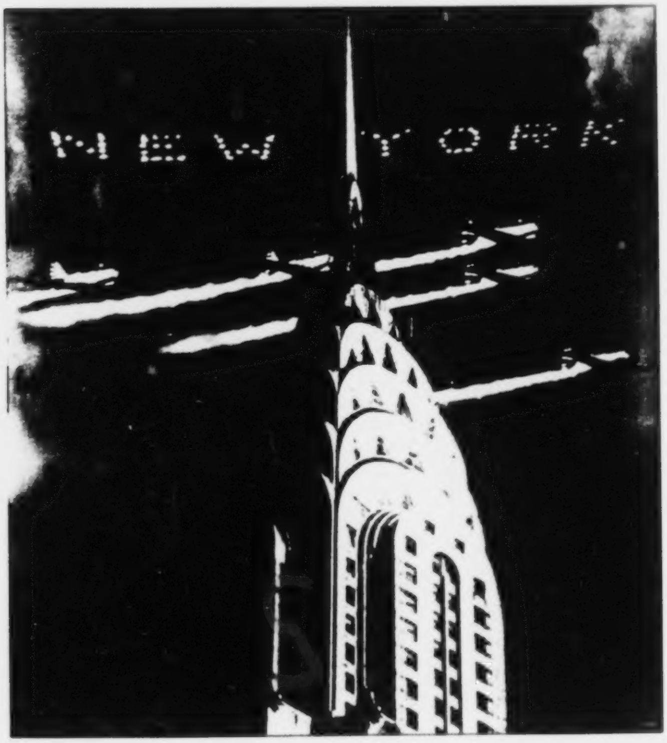
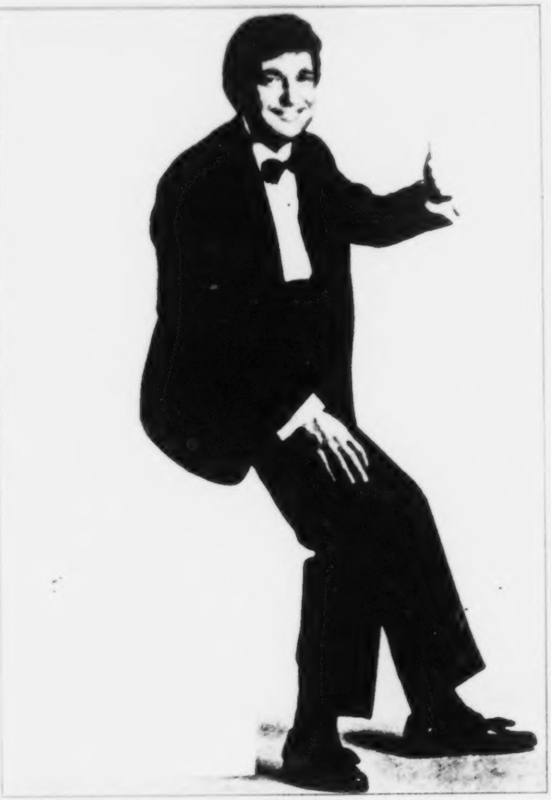
Please refer to this insert when answering questions 1 thru 15.

#12 Three images were combined: skywriting planes, the Empire State Building, and the words "New York."

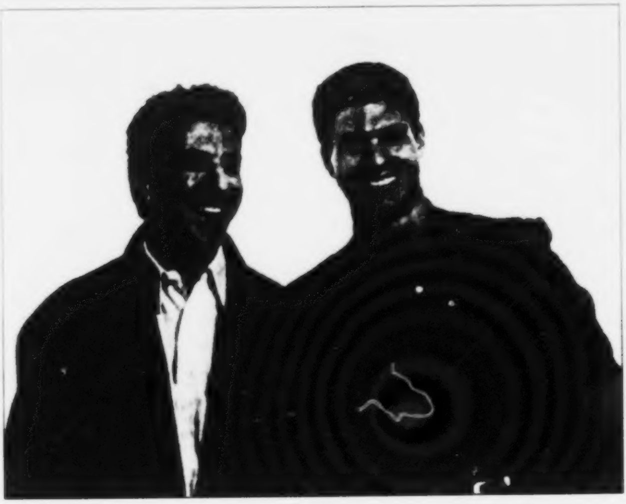


#13 A celebrity's face was combined with a photo of a posed model's body.



#14 The blue color of the sky was intensified, clouds were added and a tree branch was removed.

#15 Separate photos of two celebrities were combined.



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STRATEGIES FOR THE ANALYSIS OF LARGE-SCALE DATABASES IN COMPUTER-ASSISTED INVESTIGATIVE REPORTING

by

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August, 1991

75 WORD ABSTRACT

One major purpose of computer-assisted investigative reporting is fourth estate oversight of government. Computerized records are obtained and assessed, news goals are determined; the records are transferred to statistical software for analyses of trends, part-whole and part-part comparisons, scrutiny of specific units or phenomena, deviant and dramatic occurrences, background information, claims made by agencies and serendipitous findings. Without understanding CAIR methodology journalists will be unable to exercise their watchdog function over government performance.

250 WORD ABSTRACT

This paper sets forth major steps that can be used in computer-assisted investigative reporting (CAIR). CAIR methodology differs from that used in academic social science research. It consists of intensively analyzing large-scale databases of electronic records, such as those now routinely compiled by governmental agencies. The federal government now has an estimated 30,000 mainframes producing massive databases, many with millions of records. A CAIR analysis is pursued for purposes of fourth estate oversight and for disclosure of news revealed by its findings. CAIR methodology consists of a series of complex steps and strategies: After the needed files obtained, the news goals of the investigation are determined. Initial assessment of the records is made to identify their scope, quality and content. Deficiencies and problems are identified using specific techniques. The records are then transferred to appropriate software permitting statistical manipulation. Preliminary analyses are performed to obtain basic frequencies for all variables designed. When the data have been suitably transformed they can be examined for trends over time; parts can be compared with the whole; matched parts can be compared; detailed analyses can be done on specific units; particular phenomena can be examined; deviant cases can be studied; dramatic phenomena can be reviewed; background information for news stories can be obtained; claims made by agencies can be checked; and some serendipitous findings can be anticipated. Unless these strategies are developed and mastered, journalists will remain locked out of the truly large-scale records of the federal government.

STRATEGIES FOR THE ANALYSIS OF LARGE-SCALE DATABASES IN COMPUTER-ASSISTED INVESTIGATIVE REPORTING

The present paper sets forth in a preliminary way major steps that can be used in computer-assisted investigative reporting. This type of investigation, which for convenience will be referred to as CAIR, consists of intensively analyzing large-scale databases of electronic records, such as those now routinely compiled by governmental agencies. The focus of this paper is on massive databases, such as those produced by federal agencies, which often contain millions of records. However, many of the stategies and techniques discussed can also be used with those of smaller scale.

CAIR analysis is pursued with such databases for the purposes of fourth estate oversight and for disclosure of newsworthy situations revealed by the findings. The procedures and techniques involved will require further codification and development in the years ahead as journalists increasingly make use of such records in a systematic way to exercise their traditional role as watchdogs of the public interest. The paper points out how CAIR methodology differs from the steps used in academic social science research. It also discusses the implications of CAIR analysis for both the American press and for institutions of higher education that offer journalism education.

BACKGROUND

Over the last three decades, the federal government has shifted from maintaining the records of its agencies on traditional paper documents to storing them on tapes or other computer-readable media. In 1955 federal agencies had only 45 mainframe machines. By 1966 that had risen to 3,000. In 1975 the figure was 9000. By 1986 it leaped to 25,000 and today, it is estimated that 30,000 mainframe computers are in use by various agencies (exclusive of the military).[1] Somewhat similar changes have taken place at state and local levels, where most records are now routinely computerized.

Relatively simple analyses of smaller-scale records from state and local governments are often possible with spreadsheets, tape-readers and microcomputers. However, as the present paper shows, the investigation of federal records, where numbers of cases can be huge, may require supercomputers, sophisticated software and the use of advanced statistical procedures. These are not normally available to working journalists. For that reason, it has become increasingly difficult for the press to exercise its institutionalized surveillance function over the federal government.

Few would argue that the importance of press oversight of government agency performance is declining. In fact, during the last three decades --- since computerization of records began --- all levels of government have increased both in both size and power. Furthermore, with competition from television as a popular news medium, newspapers may be increasing their focus on in-depth reporting, and actually expanding their traditional role as the watchdog of the public interest.[2] The careful analysis of computerized records is one way in which these goals can be more effectively achieved.[3] To a certain extent investigative reporters and editors are already trying to meet this challenge.[4]

One of the limitations of past CAIR efforts is that, with few exceptions, they have been based on either state or local records. There have been relatively few that have thoroughly analyzed a numerically intensive database of the records of a major federal agency. The present paper reports in part on one such analysis. However, the overall purpose of the paper is mainly to describe and discuss the techniques and strategies that were used rather than to present detailed results. Therefore, where specific findings are presented, they are used mainly to illustrate a procedure, problem or technique.

INITIAL STEPS IN CAIR METHODOLOGY

The reason for the procedural rather than substantive focus of the paper is that both practicing journalists and journalism educators must begin the task of identifying and codifying in a detailed and practical way a systematic methodology --- a set of strategies, techniques and procedures for designing and conducting CAIR analyses of large-scale databases. That methodology may differ from that used in simpler analyses of smaller bodies of records. In addition, as will be seen, such a journalism-oriented methodology may be significantly different from that used by academic researchers who often study agencies for other purposes. There may be areas of overlap between the two types of investigations, but as will be discussed, the goals that are pursued, the strategies used for analyses, the underlying logic of decision-making and, above all, the mode of reporting on results will differ greatly between CAIR and social science research.

CAIR methodology consists of a series of steps that must be taken after deciding in a general way what agency is to be studied and for what overall purpose. Each of these steps is in itself a complex process, and its details may differ from one set of records to another, depending on the specific agency and particular goals for which the investigation is being conducted. However, there are sufficient similarities in all such investigative analyses of electronic records that the basic procedures can be identified. This will at least provide a beginning point for developing a more systematic codification of CAIR methodology.

In the sections that follow, then, the general steps that make up CAIR methodology, where truly large-scale records are involved, are set forth in overview. Illustrations will be drawn from a recent investigative analysis of massive computer files containing more than five million records of all criminal, civil and appellate transactions of the U.S. Court system over a seventeen year period.[5]

Deciding on General Goals.

As a first step, even before any records are obtained, the general goals of the investigation have to be determined. That is, an agency has to be selected; the type of records to be studied have to be identified; and the overall purpose of the investigation has to be set forth in clear terms. To illustrate, a decision was made by a small research group at Syracuse University to examine the computerized records of the U.S. Courts, including all criminal, civil and appellate cases that had been adjudicated since such computerized records began in 1970.[6]

There were two major reasons for selecting this set of records. First, the U.S. Courts represent a very important agency of government. Second, these federal records had never been analyzed before within a news framework. There was simply no way of telling what disclosures such an analysis might provide. The general goal was to look for overall trends, to compare districts, and to examine the records of particular U.S. Attorneys (federal prosecutors in charge of specific districts). No formalized theories or hypotheses were at stake because the nature of the data was unknown at this stage.

Here, it becomes immediately apparent why CAIR differs considerably from academic research. The classic model of social science research is one where the goal of the investigator is very clear. Usually it is to develop or verify some theory that explains a well-identified aspect of human behavior. Such research is often described as "value-free." That is, it's purpose is to uncover causal relationships, rather than to make assessments within a particular value framework. Before beginning, carefully formulated hypotheses are set forth. The strategy of investigation follows one of many available research designs for surveys, experiments or content analyses, which often include representative samples. The methods used provide for careful measurement of independent and dependent variables as well as for control over extraneous factors. After the relevant observations have been made, statistical indices as to their trends and tendencies are calculated. Decisions concerning the implications of the findings are based on a probabalistic epistemology of statistical significance levels.

Computer-assisted investigative reporting is not like that. It rests solidly on a clear set of values. As in any other form of reporting, the primary goals of CAIR are to seek news (rather than evidence of relationships between independent and dependent variables.) Furthermore, the search is not for just any kind of news, but that which is related to oversight and disclosure. The broad or overall purpose is to describe through a detailed look at the records what the agency under study has been "up to," and to see if this squares with value-based conceptions as to what it "should have been up to," based on considerations or rational bureacucratic functioning and democratic theory.

CAIR need not be just a "fishing expedition". The reporter may have certain "hunches" or "suspicions," regarding a particular person, topic or issue under investigation. These may serve functions analogous to those served by hypotheses in academic research in that they call for certain data to be reviewed. However, they are often derived from claims of whistle-blowers or other informants rather than from prior studies or theories. Futhermore, the directions taken during the analysis may be quite unpredictable. Whatever hunches or suspicions were being pursued may be unceremoniously abandoned when the data disclose more interesting and newsworthy information. Thus, CAIR analyses are more ammenable to fairly drastic changes of direction than is the case with social science research.

CAIR analyses are conducted differently than traditional research projects that make use of survey designs, experiments, content analyses or other observational stratgeies. As will be shown, a thorough knowledge of statistical indices and theory is essential, except in elementary analyses where the investigator is content with calculating simple measures of central tendency. There are other features of CAIR that make its procedures, strategies and methods unique to its own goals and purposes. Many of these will be brought out in discussions of the remaining steps.

Getting the Records and Related Documentation

In principle, getting copies of agency records should be easy. In practice it is occaisionally difficult. In a few cases it is all but impossible without assistance from the courts. The federal government's original (1966) "Freedom of Information Act" was written with some very real teeth. It was clearly intended to head bureaucrats off at the pass so that they wouldn't even think of trying to withhold information from the public. Its provisions make it mandatory for agencies to publish in the Federal Register (an official record of all government actions) such matters as:

(1) where a citizen should go to request an agency's records,

(2) the nature of the procedures to be followed,

(3) any forms that might be needed,

(4) any legal policies that the agency had by law to follow, and

(5) changes in policies that might inhibit obtaining of records.

At present, each of the states has also developed information laws that presumably guarantee public access to the records as well (with obvious and necessary exceptions in some areas). These are not a single federal (or state) law, but an expanding and ever-changing body of lawbook statutes, amendments to those statutes, and judicial interpretations of specific features of those laws. The result of all of this is that there is a great deal of complexity and uncertainty as to how closely citizens can look at the records accumulated by their government. Basically, one determines what a specific agency has available in the way of records. Once this is clear, a formal request to that agency is made in writing for the specific body of records needed. Such a letter should indicate who you are, what you want to do with the tapes and the grounds for waiving fees.[7]

It is essential that a request for "records" also include a specific request for the accompanying "documentation." These are the "code books" that identify what information resides on the tapes in what columns and in what format. Without the documentation, the tapes are all but worthless.[8]

If all goes well, the agency will comply. Most of the time they do, but delays, subterfuges, errors and misrepresentations are sometimes encountered. In fact, the Freedom of Information Group of the Society of Professional Journalists conducted a survey of editors and reporters who had sought such information. They concluded that many agencies were not cooperative.[9]

In the analysis of the U.S. Court records mentioned above, few problems were encountered. Indeed, during various phases of the investigation the Federal Judicial Center (research arm of the Courts) was very helpful. The Office of the Attorney General, however, upset by some of the initial findings concerning its U.S Attorneys, disputed some of the conclusions and claimed to the press that they were inaccurate. However, no support was found in the data for the Attorney General's claims.

At the state level, useful guidelines exist as to whom investigators can contact, and what the nature of the relevant statutes may be. These provide at least an initial map of potential minefields that may exist when journalists set out to explore the records of a particular branch of government. Overall, most state agencies are cooperative; some are decidedly not.[10]

Initial Assessments of the Records

This step includes two rather different kinds of activities. One can best be referred to as "charting the unknown territory." The other is "assessing overall record quality." It must be kept in mind that the records of virtually any federal agency are compiled over long periods of time by hundreds of clerks of unknown skill levels who are located in states, districts or counties throughout the United States. There are, for example, 94 U.S. Federal Court districts that include Guam, Puerto Rico and the Northern Marianna Islands. The personnel that generated the records used as illustrations in the present paper include individuals attached to federal prosecutors as well as those who kept records of actions and decisions made by judges in federal courtrooms. Computerization of these Court records began in 1970. Throughout those years there were various changes in personnel, in record format, and in many other features of the way in which the information was recorded. Thus, when the records arrived, for the investigator they were indeed an "unknown territory" that needed to be explored and charted before any kind of analysis could even be designed. A major point to note is that at this stage such tapes are not suitable in their "raw" form for any kind of manipulation or analysis. One cannot just open the box, mount a tape and start analyzing. Thus, the very first task is to determine: (1) what variables the records contain, (2) how those variables are arranged on the tapes, and (3) whether or not these features are consistent with the codes described in the accompanying documentation.

One of the best ways of initially assessing the records is literally to prepare a chart based on a printout of 50 to 100 of the lines of entries for each year on the tapes. What will be seen are just raw numbers --- no variable names, spaces, headings, or anything else. There is no way to tell where any variable begins or ends. To determine the structure of the records, the documentation must be consulted. This will provide a key as to what kind of information is supposed to be in each column. If all is well, variable names and positions can be determined, and vertical lines can be pencilled in on the printout to separate the numerically coded entries. Then, at a glance, one can identify the coding format of each variable on the tapes to see if it is consistent with the descriptions from the documentation.

Assessing overall quality is the second phase of the initial review of the records and the accompanying documentation. What this refers to is mainly a check for consistency and completeness.

For example, is a particular variable coded in the same way over the entire span of years? Does a variable appear for certain years and then disappear? A second, quite different, chart needs to be prepared at this point to reveal at a glance the status of each variable over time. On this chart, variable names are listed down the left side and the years covered are noted in the headings at the top. Within this matrix, the status of the records for each variable, year-by-year, can be pencilled in using a simple code (e.g, a "C" for complete, "M" for missing, etc.). This examination from the printouts will indicate in a preliminary way whether data are there in complete form for all years or if obvious problems exist. If something seems wrong, consult the documentation to try to find answers.

Another critical question is whether the codes always mean the same thing. For example in the Court analysis a three-digit code was used to indicate the prison term in months for which a defendant was sentenced. This seemed simple enough until it was discovered that an entry of "000" could actually mean one of two things: Either the defendant received zero months --- or a death sentence! Although the number of months is the same in each, most of us would agree they are really quite different. (The federal government can move in mysterious ways.) A close examination of the nature of the codes over time will help answer whether or not data are missing for some variables for some years. This is a critical question that determines whether various kinds of analyses (e.g., trends or comparisons of time intervals) can even be performed. Errors and difficulties are to be expected.

The two tables described provide at least an initial roadmap with which to begin exploring the database. As the analysis progresses the tables should be updated as additional problems are uncovered. (Immutable CAIR Law #1 states that the data will be flawed and desireable analyses will not be possible.) Expecting the federal government to develop consistent and completely accurate records over a long period is unrealistic.

Transferring to Statistical Software

It is this stage that separates elementary and advanced investigations. For simple analyses based on local or state records of limited size, desktop computers with spreadsheets can often be used. Percentages and simple means, or even regression analyses, can be calculated, but not much more. However, even with tape drives attached, such systems are of little value where advanced statistical software needs to be used and where the numbers of cases becomes truly massive. In the analysis of the Court records, an IBM 3090 (IBM's largest supercomputer) was used to manipulate the millions of cases involved, each with many different variables to consider. Data analyses required the use of SAS, an advanced statistical software package designed for mainframe use.

At this point, the raw numbers on the tapes must be transfered to new files in a software format that the computer can use for statistical calculations and other operations. How this is done will depend on the software to be used. Essentially, programs must be written that specify in detail which columns are designated for each of the variables, whether a particular variable is character (like names) or numeric, where the computer can find the raw data for each variable, and other information. When this has been completed, the resulting new files will be larger than those that contained the raw data.

One of the serious problems in large scale CAIR analysis is available computer capacity. (Immutable CAIR Law # 2 is that it will always be insufficient.) One reason is that vast amounts of disk space will be required just to "park" or store the data, even before analyses begin. Also, after the raw entities from the tape have been transformed into a format suitable for programming statistical calculations, the resulting files will be much larger. Finally, the machine not only needs such space to store the data itself but it requires "thrashing around" space to be able to sort and manipulate the data during statistical calculations.

In most computer environments, disk space is divided up and allocated to a large number of users. There is seldom a lot of surplus just laying around. Thus, a user coming along with a need for huge amounts of disk space cannot always count on obtaining it. However, some mainframe systems allow analysts to access unused and unassigned disk space on a temporary basis for up to 24 hours at a time. Furthermore, it may be possible to "borrow" unused disk space of other users, with their permission of course. Sometimes it is possible to string these together for a short period and use the resulting structure to manipulate large amounts of data. Indeed, in the analysis of the Court records, various jerry-built structures of assigned, borrowed and temporary disk space had to be patched together, often for a few hours late at night. This is not a happy solution, and the slightest glitch in power supply or dozens of other factors can cause loss of massive amounts of work. (Immutable CAIR law # 3 is that such losses will occur frequently.)

Obviously, this kind of work goes considerably beyond anything currently taught in journalism schools. Yet, what we are discussing is the future of investigative reporting. CAIR will not replace old-fashioned "shoeleather" investigation, but it will certainly provide priceless supplements. This is because CAIR has truly significant advantages over the sole use of traditional approaches to journalism. The large-scale analysis of vast amounts of computerized records makes it possible to address questions and obtain answers that were never even remotely possible by getting information from informants or reviewing files of paper documents. Because CAIR analyses are based on the agency's full set of records, they open a kind of "Pandora's box" of findings that even the agencies themselves do not know are there! Thus, the American press will be unable to fulfill its watchdog function without performing CAIR analyses, and journalism educators will have to begin preparing the technically trained people with both journalism and computer skills who can conduct them.

Internal Checking of Codes and Frequencies within Each Variable

After the raw data have been transferred to software, an even more detailed check on the nature and quality of the entries for each and every variable in the set of records can be conducted. The procedure here is to program the software to provide a printout of the simple frequencies of all variables by each code in the entire data set. This will reveal how many entries of different types are in each. This has several advantages. In the Court analysis, for example, one variable was "filing offense"; the frequency printout for this variable revealed how many defendants had been changed with each offense in the federal statutes. It was then possible to see at a glance which offenses were most numerous. The advantage of this kind of careful and detailed examination is that it can reveal promising directions for investigation. Knowing what entries have high and low frequencies leads to the question of "why". This can be a starting point for the design of a specific analysis that will yield newsworthy information. An additional benefit of checking frequencies is that it can reveal errors that were made when the original information was entered. For example, in the Court analysis, each violation of a federal statute has a particular numerical code. The printout of frequencies described above revealed codes in the raw data for offenses that did not exist. (Corrections were made.)

METHODOLOGICAL STRATEGIES FOR CAIR ANALYSES

Once the initial steps have been completed, analyses can begin. Some investigators may already have specific questions with which to address the records. However, in many cases it may not be clear at the outset just what can be or should be done to scrutinize an agency's records in the search for newsworthy stories. If that is the case, there are at least ten broad strategies that can be considered as guides for uncovering what the records might reveal. Each of these can be discussed briefly and illustrated with an example drawn from the analysis of the U.S. Courts.

Examine Trends Over Time

One obvious way to review records is to see what significant trends are revealed over the years. For example, if some specific phenomenon of interest can be identified, an index of its annual prevalence can be devised and its changes year-by-year can be plotted. If it shows a significant upward or downward trend that seems contrary to expectation, a newsworthy issue may have been discovered. Such a finding can be followed up in interviews with agency officials who can be asked to justify it or explain why it happened. There many ways to analyze changes over time. A knowledge of statistical theory may be needed. An illustration is provided by a look at "plea bargaining" by federal prosecutors who brought cases to trial in the U.S. Courts. Data from the nation as a whole showed a sharp and steady decline from 1980 to 1987 in the percent of criminal defendants whose cases were completed at trial. In other words, an increasing number of charges were resolved not by trial but by "other means" (e.g. plea bargaining). The finding of this trend generated a number of news stories in such media as the New York Times, and the Wall Street Journal.[11]

Compare Parts with the Whole

In a database consisting of the records of various distinct units, the performance of each can be compared with similar indices for the whole. If the unit under study departs from the whole, this provides grounds for asking those in charge to explain why it differs so much. For example, in the Court database during the years 1980 to 1987 an average of 48 percent of all civil cases, where the U.S. was either plaintif or defendant, involved contract actions (product liability, insurance, marine matters, overpayment of medicare or veteran's benefits, defaulted student loans and other contract actions). In the Southern District of New York (in which Manhattan is located) only 16 percent of all civil cases (where the U.S. was one of the litigants) were contract actions. In Northern California (which includes San Francisco) 78 percent of such civil cases involved contract actions. An obvious question to raise in an interview with the officials in charge is why such gross differences?

Compare Similar or "Matched" Parts

In a database that brings together records from numerous districts or other units, it is sometimes possible to identify and compare those that can be "matched" on selected criteria. This can reveal important differences from one unit to another that cannot be explained on the basis of social, cultural or economic differences between them. This, of course, raises the question as to whether there are differences in administrative strategies, policy applications, or personal preferences on the part of those in charge. In this type of analysis, a knowledge of statistical theory, techniques and procedures is needed. There are many ways to test and assess differences or similarities between various parameters in data derived from distinct units.

To illustrate from the Court analysis, a decision was made to select a number of "big city" federal court districts that were as similar as possible and that could be compared to see if the federal statutes were being administered in a more or less uniform manner among them. (This is a legitimate expectation grounded on the principle of the uniform application of the law, providing equal justice for all.) Selecting a number of big city districts for comparison matching was a complex statistical task that involved the use of a "cluster analysis" of hundreds of census variables that characterized each of the districts and other techniques. Census information for the entire U.S. was obtained and integrated into the investigation. Statistical analyses were performed, and similar districts were identified. They included the districts that contained the following cities: Boston, Hartford, Brooklyn, Manhattan, Newark, Philadelphia, Baltimore, Detroit, Chicago, San Francisco and Los Angeles. While these districts were by no means identical, they fell within an acceptable range of socioeconomic criteria.

This permitted asking such questions as to whether violent crime or drug abuse violations were being pursued with more or less equal vigor in each.

The analysis revealed that this was by no means the case for either of these categories. To illustrate, drug violations made up 40 per cent of the criminal cases filed by federal prosecutors in the Brooklyn district, but only 17 percent in the Los Angeles district (the U.S. average for districts was 24 percent). It is difficult to believe that Los Angeles is far more drug-free than cities such as Manhattan (37 percent), Philadelphia (29 percent) and Detroit (32 percent). It seemed more likely that different policies of enforcement were in effect. In other words, the laws were not being equally applied. This was a newsworthy situation that resulted in newspaper stories.[12]

Complete a Detailed Analysis of One Unit or Area

If there is a special need, a very detailed analysis of one region, district or other unit may be in order. For example, 1989 was an election year in New York City. One of the candidates for mayor, Rudolph Giuliani, had been a federal prosecutor in the Southern New York district (including Manhattan) for several years. As part of his platform, he claimed that he had been "tough on drugs". A detailed analysis of this district was performed on a number of categories of crimes, year-by-year, to see if his claims were true. They were. Federal drug prosecutions were up sharply, although violent crime charges filed went down in the district during those years that he was in charge. Obviously, this is the kind of information that a "shoe leather" investigative reporter could use in an interview with a political candidate.[13] (Giuliani lost to David Dinkins).

In-Depth Analysis of a Particular Category of Phenomena

By focusing on some particular category of situations, events or phenomena, popular beliefs can sometimes be checked against realities. For example, many civil actions in the Court records concerned routine administrative matters (overpayment of veteran's benefits or social security payments, defaulted student loans, etc.). This can suggest that compared to criminal behavior, civil cases concern matters that do not have serious consequences for society. However, civil cases can involve issues of great concern to the public. For example, sometimes the government sues a major manufacturer for contaminating baby food used all over the country, or it goes after a corporate polluter who has caused severe damage to the environment. At other times, individuals sue the government over such serious issues as radioactive contamination of workplaces. Obviously, the frequency, location and dispositions of such suits offer fertile avenues for pursuing newsworthy stories.

Locate and Analyze Deviant Cases

Sometimes a curiously deviant situation literally leaps out of the data. It may or may not provide the basis for a good news story. An example from the Court investigation was the finding that in the Maryland District, nearly a quarter of the federal criminal cases filed were for drunk driving and traffic offenses! That was a wildly deviant situation, because in the majority of the comparison districts that figure seldom exceeded 1 percent! As it turned out, prosecutors in the district were not wasting government resources pursuing trivial matters. The reason for the deviant figure was that in the Maryland District the federal government is responsible for the policing of a huge number of roads that are on federal land, automatically making a "federal case" out of all traffic offenses. A system of magistrates resolved the cases without clogging the regular courts, but they became a part of the records of the district. However, all such deviant cases are worth pursuing because they may reveal situations that are not so easily explained away.

Examine Dramatic Phenomena

In any investigation of records it is entirely possible that a "man bites dog" situation will be found. That is, certain dramatic and unusual information will come to light that one does not anticipate. This can provide the foundation for a news story. To illustrate, in the Court data several categories of offenses were found that were entirely unanticipated. For example, if one was tempted to think that "white slavery" was a phenomenon of opium dens in the early 19th century, one would have to think again. It is still a federal offense and a limited number of cases came before the U.S. courts during the time span of the investigation. The category of "sedition" also brings to mind an earlier era, when publishers were hauled into court for printing bad things about the government. It is still "on the books," and several defendants have been so charged in recent years. Still a third is "threats to the President." One hears about them infrequently, but the fact is that there were over 500 such cases filed in federal courts between 1980 and 1987 alone. Each of these categories could be developed into a news story.

Provide Background for Events in the News

At least some items on the daily news agenda will be related to a particular database under investigation. The mayoral election in New York has already been mentioned. Three additional examples can be cited in connection with the Court investigation. The first is the Leona Helmsley trial for income tax violations. The case received a great deal of press coverage. However, when the "hotel queen" received her sentence, a special analysis was performed for a national news medium concerning the length of sentences normally received for that category of violation. The information was provided to the CNN Business Morning program. A second instance was the computer fraud case of Robert T. Morris, who in late 1988 planted a virus that disrupted more than 2,000 computers in the country. The fact is that a number of computer violation cases have come before the courts. This information could have provided background for many news stories. Finally, when George Bush nominated Robert C. Bonner in May of 1990 to head the DEA, it was widely reported that he had been especially tough on drug offenders when he was a federal prosecutor in the Los Angeles district. At the request of the Associated Press, a detailed analysis was made of his performance in prosecuting drug offenders. In fact, his rate of drug prosecutions was below the national average and below the rate for comparable "big city" districts. This provided the basis for a number of news stories picked up from the AP service.[14]

Counter Claims Made by an Agency

There are really two variations of this analysis strategy. One is to check on claims made public by an agency. The other is to discover and make known abberations in data that an agency believes are not flawed. An example of a claim made public by an agency is one relating to drug prosecutions in the federal courts that was examined in the Court investigation. On numerous occasions, before Congress and elsewhere, spokespersons for that agency have claimed that drug cases are overwhelming the court agenda and that therefore additional personnel and budgetary resources should be allocated to the system. In the Court database it was possible to determine the actual number of individuals charged with drug offenses over the eight year period from 1980 to 1987. In 1980 some 7,781 individuals were charged with offenses pertaining to marihuana, heroin, cocaine, plus various other narcotics and controlled substances. This rose to an estimated 16,902 for 1987. That is clearly an increase, and it certainly seems impressive. However, looked at in another way, drug offenses rose from 19 percent of all offenses to 30 percent during the same period --- an increase of eleven percent of the cases. Furthermore, offsetting this were steady decreases in such categories of violations as those related to immigration, violent crime and others. Thus, the mix changed, but whether this "clogged" the courts is not clear.

The second strategy, discovering and making known abberations that an agency does not know exist, is somewhat different but it can be very important. The reason is that the records of an agency are used as a basis for internal allocations of resources and for policy decisions that can have an impact on the public. If gross abberations are discovered in the database, those allocations and policies may prove to have been ill-advised. In the Court analysis an apparent unexpected decline in the number of some kinds of drug offenses and an increase in others was discovered in the records for one period. It turned out to be due to a change in the way they had been coded (rather than an actual shift). When this was called to the attention of the relevant personnel in the agency they were reluctant to believe that it had happened.[15] After being persuaded to recheck the data themselves, they admitted that the problem in the data was there. Such an abberation may or may not be a good basis for a news story. In this case it was not used in that manner.

Serendipitous Discovery of New Avenues for Analysis

On occasion, while pursuing a different analysis, a particular situation is discovered that offers a "hot trail" for a potentially significant news story. Such a serendipitous situation occurred in the Court analysis when by chance a comparison was made of defendants in one district who had court-appointed lawyers vs those who had private attorneys. A considerable difference was noted in the length of the sentence that defendants charged with similar crimes had received. Those with court-appointed lawyers received much longer sentences. If this is true for the nation as a whole, it calls into serious question the fairness of the federal court system. This finding would prompt one to examine differences by race, by region, by gender, and other variables. That analysis remains to be done, but it does illustrate the idea that one simply never knows what will turn up in a CAIR investigation of a large-scale database of the records of a federal agency.

DISCUSSION AND CONCLUSIONS

The ten strategies noted above, plus the preliminary stages of data examination and transformation, provide at least a preliminary view of what CAIR methodology will look like as it becomes increasingly codified. At this point it appears that it will be far more than an unguided or random search through records. It can follow clear objectives, even if the investigator does not have a specific set of well-formulated hypotheses to begin with. In many ways it is a process of entering an unknown territory that has to be surveyed and mapped before any real exploration to find newsworthy issues can begin. And, while it draws on some of the logic and statistical tools developed within social science research, it is really quite a distinct process.

In the years ahead, the sophistication of CAIR methodology can be expected to increase. For example, it may be possible to use supercomputers designed for "parallel processing" to greatly reduce the time needed to calculate statistical information from numerically intensive files. In addition, various "artificial intelligence" approaches may be possible to make it simpler for non-specialists to pose questions for analysis and obtain answers without having to program each search laboriously and design analyses from scratch. As yet, these applications remain to be explored.

In conclusion, two truly important questions emerge from this overview of CAIR methodology. First, given the existence of a huge number of numerically intensive records that are being produced every year by our public agencies, what are our American news media going to do about it? And second, what are American institutions of higher education who teach journalism going to do about it?

Like it or not, the former have a responsibility to examine these records so that they can effectively exercise their traditional fourth estate role as the watchdogs of the public interest. In an age of electronic record-keeping this can no longer be through leaks of a few paper documents, by getting information from whistleblowers, or by interviewing public officials. Such shoeleather reporting techniques remain very important, but adding the dimension of full knowledge of what an agency has been "up to" through an intensive analysis of all of its records gives the investigative reporter an edge that he or she has never known before. If the press fails to rise to this technological challenge, it will increasingly be locked out of information as to how well federal agencies are actually functioning, and its oversight mission will be poorly performed.

For schools, departments and programs in journalism this paper provides a stark look at the future. As Donald L. Shaw noted, upon assuming the editorship of the Journalism Quarterly in 1990, ". . . one wonders if we should examine our curricula programs to help our students better confront the 21st century."[16] It seems clear that his point is well taken. Curriculum development strategies must go beyond just teaching students how to put together a news story that meets current industry standards. Courses will have to be developed in the years ahead that teach our future journalists how to gain access to computerized public records, how to devise strategies of analysis appropriate for the pursuit of newsworthy findings within them, and how to use computer and statistical skills required to achieve those objectives.

NOTES

1.Martha Mulford Gray, Computers in the Federal Government (Washington, D.C.: National Bureau of Standards, 1978), Special Publication 500-46; Report 2, Managing End Computer Using in the Federal Government (Washington, D.C.: U.S. General Services Administration, Information Resources Management Services, 1986).

2.See, for example, the following news stories: "Sons, Daughters of State Leaders Get 8 1/2 Percent RIMFHC Loans, "The Providence Sunday Journal, (RI) June 2, 1985, p. 1 and A-18; "1,140 Mortgages Not Listed in RIHMC Files, "The Providence Journal, June 8, 1985; "Caesarean Sections," Asbury Park Press (NJ), December 11, 1988, p. F-4 and F 14; "Health and Wealth: Poverty and Disease in Onondaga County," Syracuse Herald-Journal (NY), February, 28, 1989, pp. A-2, AA-12.

3.The federal government has generated such massive files of records that it doesn't even know what data it has. Few have ever been systematically examined. See: "In Anti-Laundering Move, U.S. Will Regulate Transfers," New York Times, October 6th, 1989, pp. 1,23,D. This article notes that a special agency is being established just to sort out and understand the scope of files that have accumulated in several major agencies.

4.In September of 1990, The Gannett Foundation Center for Media Studies at Columbia University prepared a special report for its Technology Studies seminar series entitled, "Computers and Investigative Reporting: A Selected Chronology". The report listed eighteen stories from various American newspapers that had published such stories. Some had won Pulitzer prizes. None was an analysis of a large-scale federal database.

5.This analysis was conducted for purposes of investigative reporting and it resulted in numerous stories in various national newspapers and other media. See: Margaret H. DeFleur, "Supporting the Watchdog: Aiding the Press Through Computer-Assisted Investigative Reporting," chapter in Hilton U. Brown, III, ed., Computer Assisted Analyses and Modeling on the IBM 3090 (Boston: Mass.: MIT Press, 1991).

6.The organization is Transactional Records Access Clearinghouse (TRAC) at Syracuse University. Its purpose is to conduct oversight of federal agencies by analyzing their computerized records and providing reports on the results to the press, public interest groups, academicians and government.

7.Relatively modest fees may be charged for blank tapes, mailing etc. if the individual requesting is a journalist or academic researcher. If the records are to be used for commercial purposes the fees may be hefty.

8.Unfortunately, the federal government has been lax in preserving some documentation. For example, two hundred reels of 17-year old tapes were recently destroyed because no one could decipher what the names and numbers on them meant. See: The Post Standard (Syracuse, N.Y.), Wed. January 2, 1991, p. A-1. (This is an AP wire story from Washington, D.C.)

9.For a summary of the Committee's findings, see "Life on the FOIA Front: Delays, Misrepresentations, Over-editing, Favoritism," The Quill, December, 1989/ January 1990, p. 19.

10.A very useful example of such guidelines has been prepared for gaining access to state records. See: Kirtley, Jane, ed., Access to Electronic records: A Guide to Reporting on State and Local Government in the Computer Age (Washington, D.C.: The Reporter's Committee on Freedom of the Press, 1990). Their address is: Suite 504, 1735 Eye Street, N.W., Washington D.C. 20006.

11.Examples of stories generated by this aspect of the investigation are: William Glaberson, "Study Sees More U.S. Plea Bargains," The New York Times, Oct. 29, 1989, p. 35; Michael Chechio, "Study Finds Pleas Bargains Rise," The Recorder (official newspaper for the U.S. and district courts, County of San Francisco) Nov. 1, 1989; Melinoa Grenier Guiles and Wade Lambert, "Federal Prosecutors are Concluding Fewer Criminal Cases with Trials," The Wall Street Journal, Oct. 30, 1989, p. B10.

12.For example, see Ronald J. Ostrow, "Federal Drug Prosecutions Lag in L.A.," The Los Angeles Times, Nov. 6th, 1989 (California and West Section).

13.Stories on this issue that were generated were: "Manhattan Feds Saw More Crime than Brooklyn's," New York Newsday, Oct. 29, 1998, by Dennis Bell; Also by Dennis Bell in the same issue, "Figures: Rudy Staff Busier."

14.Examples are: Michael J. Sniffen (AP), "S.U. Group Tracks Nominee for DEA," The Post Standard, May 21, 1990, p. B2; "Bush's Drug Pick Hit for Trial Record," Chicago Tribune, May 21, 1990, News, p. 10.; "Drug Arrests Lagged," New York Newsday, May 21, 1990, News, p. 12.; "Study Cites Record of DEA Nominee," The Los Angeles Times, May 21, 1990, National, p. 18.

15.What had been labeled as "narcotics offenses" or "cocaine offenses" was actually something quite different.

16.Donald L. Shaw, "Editorial Comment," Journalism Quarterly, 67, Summer, 1990, p. 273.

ADVANCED PROMOTION TECHNOLOGIES' "COMPLETE PROMOTION DELIVERY SYSTEM"

Is it a "Leading Indicator" of Advertising and Sales Promotion Trends for the Nineties and Beyond?

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ABSTRACT

This study examines grocery buying consumers' usage of and attitudes toward an interactive, database, targeted advertising and promotion delivery system and frequent shopper program being test marketed in supermarket checkout lanes by Advanced Promotion Technologies. The "system" combines a variety of electronic marketing components -- Vision Smart Card, touch-sensitive video screen, videodisc TV commercials and computer graphics plus in-line coupon printer -- all triggered by the supermarkets' UPC checkout scanners to deliver advertising messages and sales promotion offers on sponsoring products to target individuals.

(Note: Advanced Promotion Technologies is a joint venture of the Procter & Gamble Company, Dun & Bradstreet Corporation, CheckRobot Inc., Schlumberger Technologies, Inc., The Central Bancorporation, Inc., and GTE Interactive Services, Inc.)

"Market Changes Shaking Up Madison Ave.," reads the headline in The New York Times. "The growth of mass advertising has come to a virtual halt, agency profit margins have been cut in half, and advertising agencies are going through a painful consolidation that is reaching into the deepest corners of the industry." (Rothenberg, 1989) And what is responsible for this upheaval? Several factors, say many advertising practitioners and academics, but key among them is the growth in retailers' use of database marketing with much of the data coming from their UPC scanners. Bar-code scanners, now in more than 50% of U.S. supermarkets, "are giving retailers increasing power to analyze customer preferences." (Rothenberg, 1989) This power has enabled retailers to put pressure on manufacturers to shift spending out of national advertising and into discounting fees for retailers and other promotions. Now, the UPC scanner may take on even more importance as it becomes the "trigger" for a whole new array of electronic marketing tools--tools that may force advertisers and their agencies to begin thinking about the individual as a "target audience."

BACKGROUND

Historically, advertising and sales promotion programs of U.S. packaged goods companies have been directed toward "target audiences" -- groups of people who marketers think will buy their products. Typical planning efforts have incorporated demographic, psychographic and behavioral research to assist marketers in identifying these "target audiences."

A new electronic marketing system being tested by Advanced Promotion Technologies allows for precise targeting to individuals since the system reacts to shoppers' purchases. It also makes it possible to simultaneously direct different advertising and sales promotion offers to different individual targets. Company promotional literature uses the following examples: "....you might want to offer high-value refunds, price packs or coupons to non-users of a brand or service. Or, you might want to increase consumption among current users by delivering a recipe or other multiple-purchase incentive. These promotions - plus sweepstakes, games, near-pack premiums and more - are all possible..." (APT, 1989) and all at one time.

The system also collects brand-purchase information, including package sizes and quantities, by individual name and address for future use in direct marketing efforts.

Touted by APT as the "first complete promotion delivery system for supermarket checkout lanes," the program combines a touch-sensitive video screen with audio, computer graphics, printer and videodisc in each checkout lane. The equipment is "triggered" by the store's UPC laser scanners to deliver advertising messages, sales promotion offers and financial services while the consumer is checking out purchases.

In the checkout lanes, the offers are communicated to buyers via the touch screen video and audio monitor, and often the video presentations contain elements from a sponsoring brand's national television commercials. Company literature specifies that, "All promotions are complemented by video messages which explain the promotion and product benefits to shoppers."

The system being tested relies on a frequent shopper, points-for-purchases club to build the audience base. Points are available on over 450 participating brand name products. Grocery categories with brand participation include beverages, cake mixes and baking supplies, dairy, frozen foods, dry grocery, health & beauty, household, meats, paper products and pet foods. (Exhibit I is participating brands list.)

Point-of sale advertising throughout the store--shelf-rail strips, display signs and free "shopping lists" with instant savings and special offers on featured products--constantly promote the program. Offers are changed about every 30 days. (See Exhibit II.)

Membership is solicited by direct mail to households in zip codes constituting a store's trading radius and by an in-store video kiosk with racks of printed application materials. The application (see Exhibit III) offers either a "plain" Vision Value membership card or one with VISA option. Applicants must provide name and address, date of birth, social security number, children's names (if applicable) and birth dates, ownership of pets and ownership of selected appliances and recreational products. Applicants are also asked to check, "How do you choose your grocery store?" and to select one from a list of reasons, "Why you most often switch brands?" There is also an Electronic Check Option which requires name of bank and type/number of account. The VISA option requires additional financial disclosure information.

A Vision Value Club membership kit containing a brochure promoting participation in the program and a prize-point gift catalog is sent free to each new member. (See Exhibit IV.) A "smart" credit-type card which contains a microchip that holds basic demographic information relevant to the holder and the holder's immediate family is included in the kit.

According to APT's trade promotional literature,

> ...the chip (on the member's card) provides the key element of difference between this and other "frequent shopper" offerings, managing the program by identifying the shopper, keeping track of frequent shopper points, delivering promotion incentives based on demographics, compiling a purchase history, and facilitating financial services such as VISA credit, electronic checking or check approval.

Members insert the Vision card in a card reader at time of check out. The system automatically adds points to the chip on the card, even for purchases that have been scanned before the card was placed in the reader. The card is supposed to be used each time grocery purchases are made. (APT, 1989)

A recent article by Bruce Bendinger on nineties media, in Chicago's SCREEN Magazine entitled *THE BUZZ* , used a mock Vision Value shopping experience to illustrate some of the highlights of this electronic marketing system:

> Now when you check out-here's the beauty part. The screen highlights your name and your current point total and flutter cuts

> through participating sponsors and wonderful widgets you can win...you watch the screen as your total builds. Okay, now let's say you just bought Campbell's Mushroom Soup. Rrrrrp...zap...zip...! Guess what spits out of the machine (printer)? A recipe for...Yep. And your Kraft Macaroni & Cheese? Well that gets you a coupon good for the Velveeta version on your next purchase. All punctuated with little messages and video visuals.
>
> Now, in eager anticipation, we see what happens with our big box of All-Temperature Cheer - 50 in 100 get 25 cents off, 36 in 100 get 50 cents off, 10 in 100 get a dollar off, and 4 folks in 100 get it FREE! Winner!!
>
> They've turned the cash register (scanner) into a slot machine. They also know you like Mushroom Soup and Macaroni and Cheese.
>
> And they have your address and telephone number. BUZZZZ.

Research Objective

The primary objective of this research was to determine to what extent the Vision 1000 system and its companion frequent shopper program, the Vision Value Club, encourage shopper loyalty to the sponsoring store and brand loyalty to the sponsoring brands.

Does this system, "...permit both retailers and manufacturers to attract customers who were neither shopping their stores fully nor buying their products... help draw shoppers to undershopped or bypassed departments...or motivate light shoppers of a store to become heavy ones?" (Weinstein, 1991)

The data gathered will also serve as a benchmark for future research into the impact of this system on traditional media, particularly the roles now played by magazines, newspapers and Free Standing Inserts in their mass delivery of coupons and other sales promotion offers. Additional studies will investigate the role of this system, if any, in brand-switching and brand trial.

Method

To evaluate consumers' usage of and attitudes toward the Vision™ and Vision Value™ systems, an in-depth phone survey was conducted among shoppers who purchase their groceries at the site where this system is being tested and who are members of the system's Vision Value Club frequent shopper program. The test site is in West Des Moines, Iowa, a predominantly white middle class suburb. The test has been in operation for about 20 months.

Random sample listings of phone numbers covering the entire population in zip codes surrounding the test site were purchased from Survey Sampling Inc. The U.S. Postal Service had recently created a new zip code in the area surrounding the test site, composed of households from two larger zip codes which had not been incorporated by national list services at the time the research was fielded. This required purchase of an additional "radius" list from Maritz, Inc.

Respondents were first screened to determine if they purchased groceries at the test site location. The response was as follows:

Activity	**Number**	**% Total**
Completed screening calls	2,465	100.0
Did not shop at test site	1,736	70.4
Shop at test site	729	29.6

Those who shopped at the test site location were screened for membership in the Vision Value Club program. The response was as follows:

Activity	**Number**	**%Total**
Shop at test site	729	100.0
Shop at test site but not VVC member	489	67.1
Shop at test site and member of VVC		
Completed interviews	240	32.9

Questionnaire Design

A questionnaire containing 42 questions, including awareness of the system, usage of the "smart card," participation in the sales promotion offers of sponsoring brands, recall of brands advertised and overall evaluation of the program and the system, were pretested on 12 Vision Value Club members in store intercepts. The results of this pretest indicated that the length of the questionnaire created respondent fatigue which would be compounded in a phone survey format. Rewording and consolidation resulted in a final questionnaire containing 36 questions which was pretested in phone surveys with 24 Vision Value Club members with no evidence of respondent fatigue.

Phone surveys began in November,1990, and were conducted by Per Mar Research personnel and undergraduate students trained by Per Mar field managers. Interviewing continued during November and December, 1990. Findings were tabulated using SPSS (Statistical Package for the Social Sciences) on a VAX 8600 computer.

FINDINGS

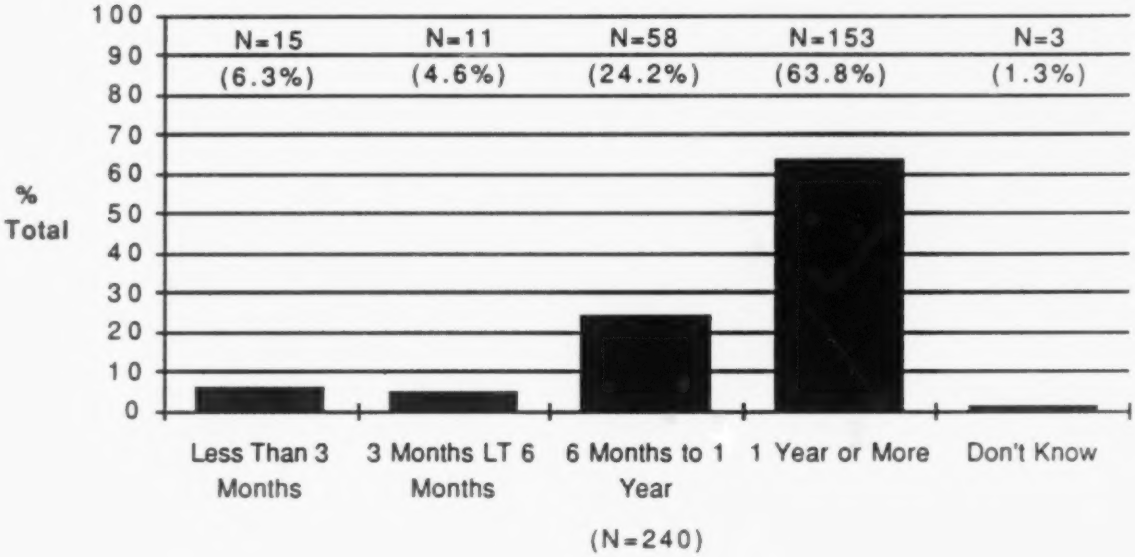
The findings were drawn from 240 completed phone interviews with "persons responsible for grocery shopping," who stated they were members of the Vision Value Club. In identifying the primary shoppers, 211 (87.9%) were reported as female, 29 (12.1%) male.

Membership:

The first grouping of questions, designed to gain an understanding of the membership in the Vision Value Club, included questions on the type of Vision Value card held, how long respondents had been members of the Vision Value Club and frequency of card use on grocery shopping trips. Ninety-point-four percent (90.4%) of respondents hold the "plain" Vision Value card while 5.8% hold the card with the VISA option; 3.8% replied that they didn't know which card they held. A majority (63.8%)

have been members for longer than a year, 24.2% have been members between six months and one year, 4.6% for between three and six months, 6.3% for less than three months, and 1.3% weren't sure how long they had been members.

Chart #1: How Long Been Member?

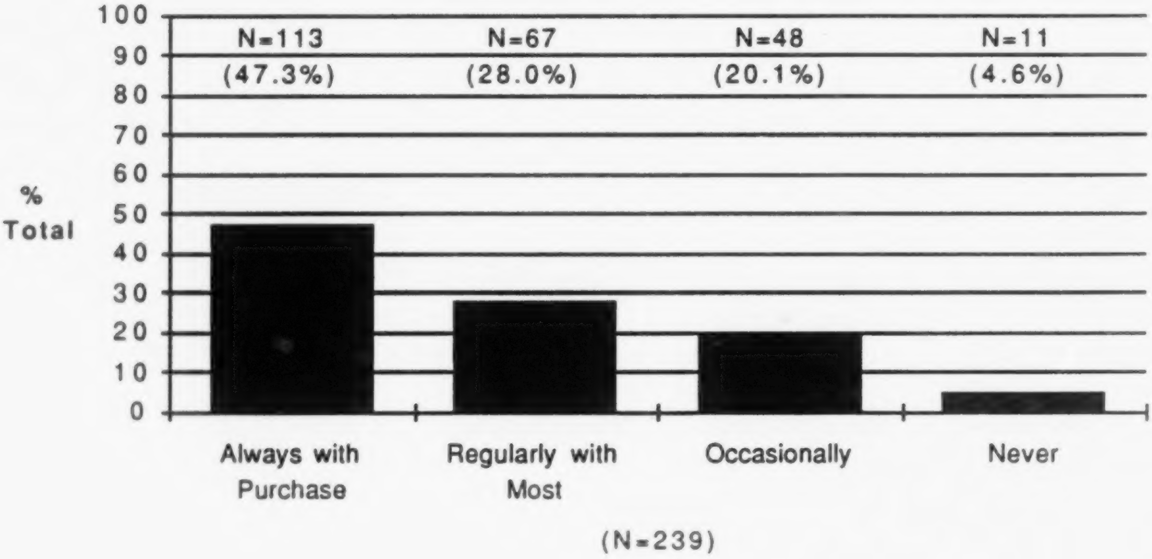


There were also 489 respondents who were not members, and they were asked why they were not members. The primary reasons were "not interested" (25.5%), "don't shop there often enough" (25.1%), "don't know what it is" (15.0%). Other responses included "never heard of it" (10.8%), "don't want to" (5.6%), and a variety of other reasons (18.0%).

Asked about frequency of card use on grocery shopping trips to the test store, almost half of the respondents (47.3%) said they use it with all purchases, and 28.0% replied that they regularly use the card with most purchases. Twenty-point-one percent use their card only occasionally, and 4.6% said they never use it.

(Note: The card has to be read at time of check out for points to be accumulated or else the member has to keep the grocery receipt, and points are added on a future trip when the card is on hand.)

Chart #2: How Often Use?

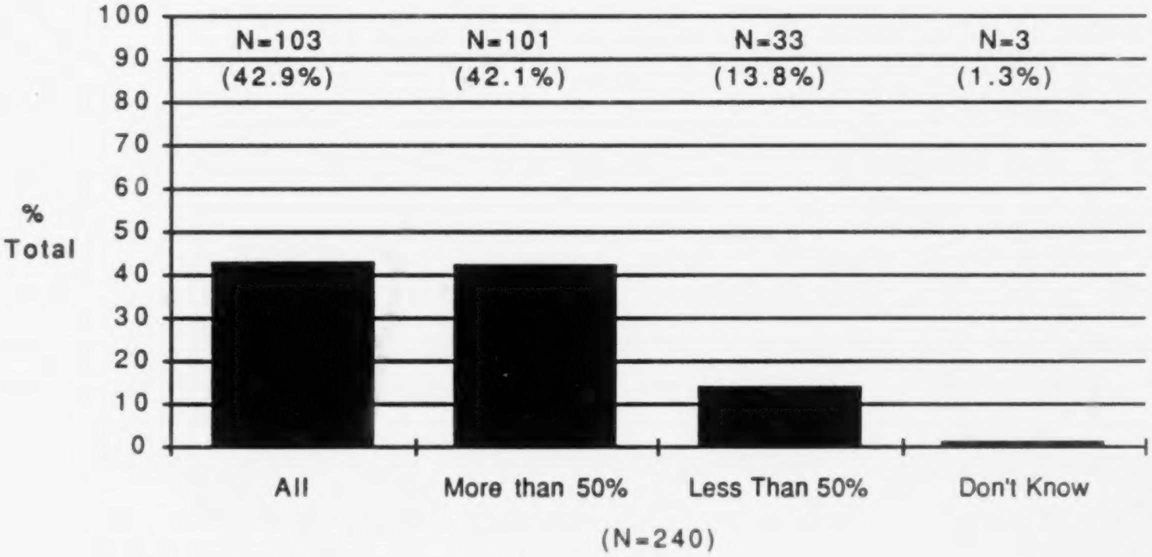


Shopping Patterns:

A second grouping of questions sought information on members' grocery store selection criteria and shopping patterns. When respondents were asked how they choose a store for their grocery shopping, the majority (57.1%) gave "location" as the main reason, followed by "merchandise selection" (12.1%), "low prices" (11.3%), "atmosphere" (7.5%), "service" (5.8%), "because of Vision Value Club" (0.4%), and "other" (5.8%).

To determine how important the store is relative to other grocery stores in the respondents' overall grocery shopping patterns, the survey asked how much of the respondents' grocery shopping is done at the test store. Forty-two-point-nine percent said they did all of their grocery shopping at the test store while another 42.1% do more than 50% of their shopping there. Only 13.8% of respondents do less than half of their grocery shopping at the test store, and 1.3% didn't know what portion of their shopping was done at the store.

Chart #3: Percentage Shop Dahls



Card Use vs. Shopping Patterns:

In the questionnaire design, it was hypothesized that a high correlation would be found between respondents' "frequency of card use" and "percent of shopping done at the test site." A cross-tabulation of these two questions showed that 68.0% of those who do all their shopping at the test site use their Vision Value card "always with purchase." Twenty-five-point-two percent who do all their shopping at the test site use their card "regularly with most purchases." Of the remaining respondents who did all their shopping at the test site, only 4.9% used their card "occasionally," and 1.9% "never."

The table below details results of the cross tabulation:

How Often Use by Percentage Shop Dahl's

		Percentage Shop	
How Often Use?	All	More Than 50%	Less Than 50%
Always with Purchase	N=70 68.0%	N=37 37.0%	N=6 18.2%
Regularly with Most Purchases	N=26 25.2%	N=35 35.0%	N=5 15.2%
Occasionally	N=5 4.9%	N=23 23.0%	N=18 54.5%
Never	N=2 1.9%	N=5 5.0%	N=4 12.1%

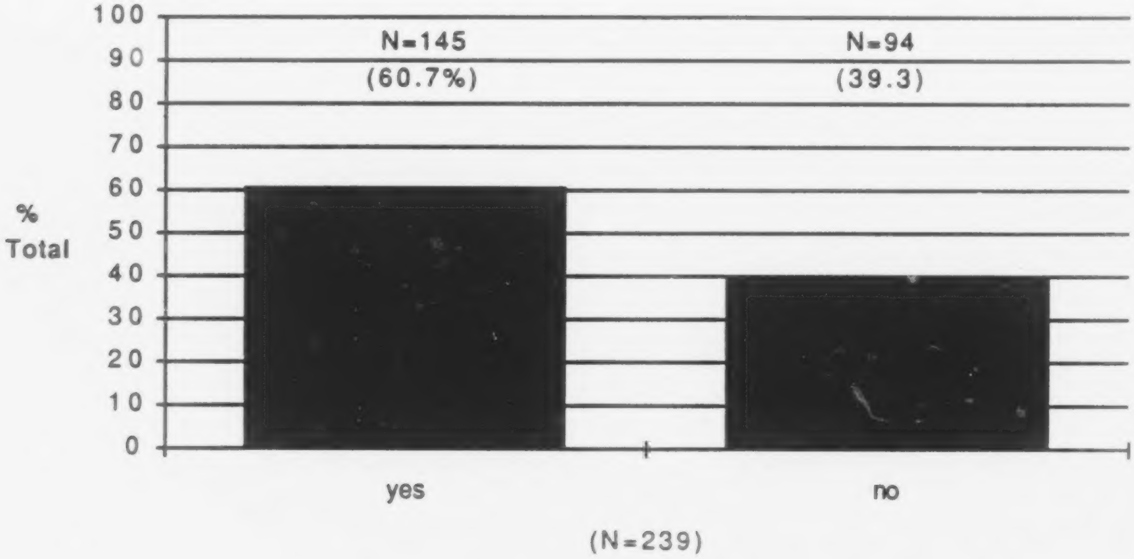
Chi-Square: $p<.05$

USAGE OF COMPONENTS

Interaction with Monitor:

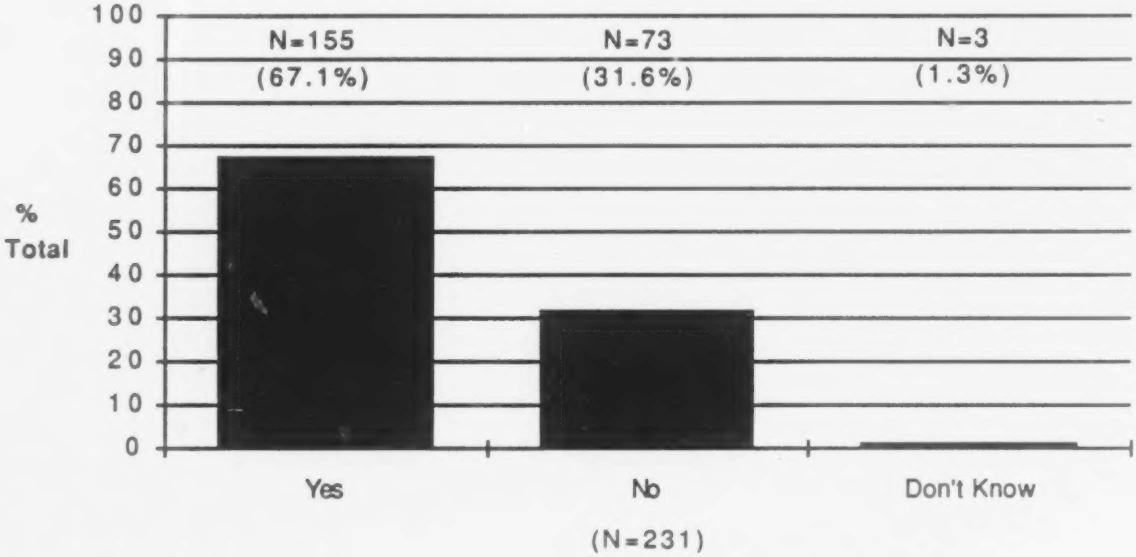
A third grouping of questions dealt with respondents' understanding and usage of some of the system's components, including the interactive video monitor and coupon printer in each checkout lane. First, respondents were told, "There is a TV monitor at the checkout stand that offers recipes and coupons." They were then asked, "Have you asked it for any of the recipes or coupons?" A majority (60.7%) had used the touch screen monitor to ask for coupons or recipes.

Chart #4: Tv Recipes or Coupons



A follow-up question asked respondents if they had "redeemed any coupons on grocery items in the past month?" Again, a majority of respondents (67.1%) replied positively, as shown in Chart #5.

Chart #5: Redeemed Coupons Past Month

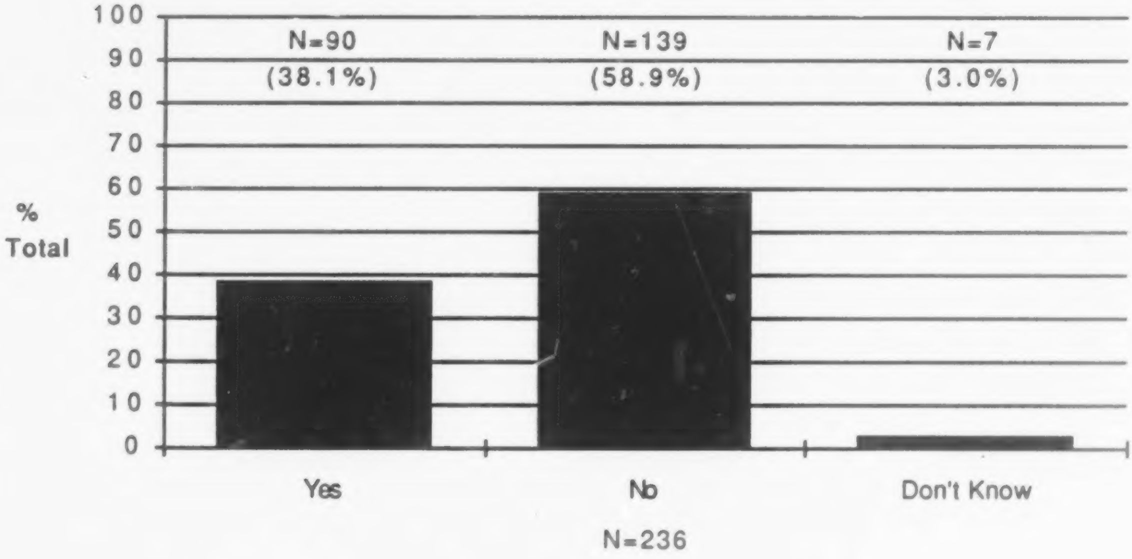


The above findings have a high correlation with national coupon research conducted by Mediamark Research, Inc. In the Fall of 1989, MRI estimated there were 66,916,000 adult users of "any" coupons in the U.S.--64.8% of the adult population. Users of "any" coupons were defined as those households which had used any amount of coupons in the past three months. (DMB&B, 1991)

Brand Recall:

To obtain some benchmark data for additional research efforts into brand-switching and brand trial, questions sought brand recall information as a result of exposure to the Vision Value system. Respondents were asked, "Can you recall any of the brands that showed ads or recipes on the monitors?" If they could, they were asked to name some in an open-ended format. Thirty-eight percent of respondents said they could recall some brands that had ads, recipes or offers on the monitor.

Chart #6: Brand Recall - TV Recipes, Ads



In reviewing the brand names mentioned by these respondents, over 50% mentioned were sponsoring brands under the Vision Value program at this test store.

Respondent Evaluation:

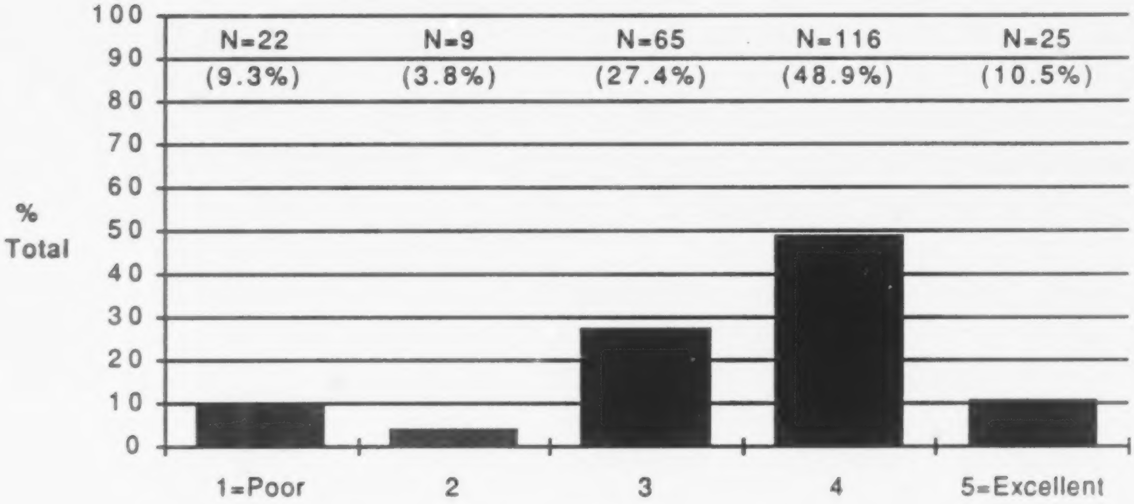
Respondents were asked to select some of the best and some of the worst characteristics of the Vision Value program. More than half (54.6%) mentioned the opportunity for free merchandise as one of the best characteristics.

Slightly over one quarter (25.4%) said one of the best characteristics was the fact that the program didn't involve stamps (a reference to savings stamp programs). Additional "best" characteristics included "information given through monitor at check out" (18.8%), "types of gifts" (10.4%), the free shoppers guide/grocery list with chances to win bonus points (8.8%), and a variety of "other" (18.8%).

Asked to select some of the worst characteristics of the Vision Value program, respondents most frequently selected "forgetting their card" (30.0%), and "having the computer system inoperable" (24.2%). Other worst characteristics included "not all brands worth points" (15.0%), "hassle using card at check out" (10.4%), “computerization” (7.9%), “need to carry another card” (7.1%), and "hassle with free gifts" (2.5%). "Other" worst characteristics were mentioned by 22.5%. (Best and worst characteristics responses add to more than 100% due to multiple mentions.)

Respondents were also asked to rate the Vision Value program on a scale of 1 to 5, where 1 is “poor” and 5 is “excellent.” A majority of all respondents (59.4%) gave the program a rating of 4 or 5. Almost half (48.9%) gave the program a rating of 4, while 10.5% gave it a rating of 5. Another 27.4% gave Vision Value a rating of 3. Thirteen percent of respondents rated the program as “poor,” 3.8% giving it a rating of 2, and 9.3% giving Vision Value the lowest rating of 1.

Chart #7: Rating Vision Value



(N=237) (M=3.477)

SUMMARY OF FINDINGS

The reported findings suggest that the Vision 1000 system and companion Vision Value Club frequent shopper program do encourage shopper loyalty and may be a significant factor in promoting brand loyalty to participating sponsors' products. The findings also support the hypothesis that the more frequently the "smart card" is used by the Vision Value member on grocery shopping trips, the more likely that member will shop exclusively at the test store.

Findings also support consumer satisfaction with the system as a couponing vehicle, with results similar to the MRI national study on coupon usage. (DMB&B, 1991)

No implications can be drawn on the ability of this system to generate volume increases for the test store or for the participating brands, although anecdotal reference to "phenomenal tonnage increases" from similar systems are presented in the following discussion. No implications on cost effectiveness of the program for participating brands or retailers can be drawn from the findings presented.

DISCUSSION

A November, 1989, *Progressive Grocer* article--Database Marketing Demystified, by Warren Thayer--discussed the status of the Vision Value system and competitive electronic marketing systems from the grocery retailers' viewpoint. "There is widespread agreement that the competitive advantage of having a database marketing program is enormous. For this reason, many retailers are reluctant to discuss their successes." Vons Grocery Co's., El Monte,Calif., has had such success that, "We're not comfortable talking about it.," according to Frank A. Woodward, director of electronic marketing. "I tell you, the tonnage increases in product movement have been nothing short of phenomenal and customer acceptance has been excellent," he said. (Thayer, 1989)

Results to date:

In a February 1991 speech to the Direct Marketing Association, Catherine Amann, manager, Marketing Communications for Advanced Promotion Technologies, talked about the results Vision has delivered to date:

> Within six weeks of the introduction of the system at Dahl's, roughly 70% of all the store's customers had applied for the Vision Value card. Now, the average order size in the Dahl's store prior to the Vision Value Club was about on target with the U.S. average for a store this size.

75

> Since the introduction of the Vision Value Club, the average transaction size of non-card users has held even with the pre-Vision average. *However*, the average transaction size of Vision Value Club members is consistently more than double the non-card user order size.
>
> As you might expect, with the average order size increasing so dramatically, total store volume has also increased dramatically. Volume in the benchmark store has been nearly flat, showing only a 5% increase attributable to area growth, but volume in the test store rose 20% and has been on a steady increase.
>
> The Dahl's installation has proven so successful that we have installed the Vision system in several test market sites throughout the country to test its impact on the purchase patterns in various geographical areas. Several major supermarket retail chains...among them Kroger Food Stores, Big Bear Stores, and Safeway Stores of Northern California...have shown a progressive spirit by installing the Vision system and are now beginning to see similar results as those reported at Dahl's. Clearly, the Dahl's customers like the system, and that has resulted in more sales and more profit for Dahl's. (Amann, 1991)

The branded product advertiser's perspective was represented in the *Progressive Grocer* article by a packaged goods source who,

> ...believes the building of large databases will fuel the shift toward direct marketing and away from traditional advertising such as newspapers and television. It's only a matter of time before this trend really accelerates. Data-based marketing and frequent shopper programs make sense not only for retailers, but for manufacturers wanting to get promotion back under control. (Thayer, 1989)

PRIVACY CONCERNS

As database advertising and sales promotion programs grow, who will store data and how will they use the data? Will consumer privacy become an issue? Marketers point out that consumers provide the information voluntarily. Bonnie Jansen, director of public affairs for the U.S. Office of Consumer Affairs in Washington, said:

> We've written to all the key players - the grocers and the technology providers - advising them to tell consumers up front in plain English what data they're collecting, why, what will it be used for and who will have access to it. There are very few laws now on the collection of data by the private sector - most relate to what government can and cannot do. But we will see consumer outrage if this data is given to groups that do a lot of telemarketing or aggressive selling. That's how marketers could shoot themselves in the foot, and that's what could result in proposals for federal legislation. (Thayer, 1989)

As answers to these questions become available and more electronic marketing programs collect data on individual customers, "The doors are open to what Professor Don Schultz of Northwestern University, in a speech on database marketing at the Food Marketing Institute, calls pro-active marketing...too many retailers react to events after the fact instead of taking pro-active steps to create opportunity." (Thayer, 1989)

FUTURE GROWTH

Advanced Promotion Technologies will expand the test of the Vision 1000 system and the Vision Value Club frequent shopper program. It expects to be in some 40 stores by the end of 1991. National rollout may not occur for several years. A January, 1991, article in *Progressive Grocer* , entitled The Short Circuits of Electronic Marketing, talks about some of the pitfalls facing electronic marketers in the future. One key issue is whether grocery retailers or third-party firms, such as APT, should be managing the programs. Another issue is the rapid growth of third-party companies over the past 12 to 18 months. Market Growth Resources estimates there are now between 30 and 40 companies offering some sort of electronic marketing program. All, however, are in the test or rollout phase of their programs. A third important issue is, "Who will pay for third party expansion? At the moment, most of the tests are being financed by participating manufacturers." (Weinstein, 1991)

The Food Marketing Institute, a national association of grocery manufacturers and supermarket retailers, conducted a study in late 1990 of 30 companies operating about 5,200 stores that updates the use of electronic marketing applications by supermarkets. The study predicts that "the biggest growth for supermarket electronic marketing applications is for coupons." (Weinstein, 1991)

The table below shows the percent of stores from this survey which are active with electronic marketing applications, by type of application, and the percent of stores which plan to add electronic marketing applications in the next 12 months. (Miller, 1991)

Application	% of Stores Active	% of Stores Planned
Electronic Signs	14%	1%
In-store broadcast	13	-
Electronic coupons	12	31
Electronic rebates	6	5
Frequent Shopper	3	8
Others*	3	5

*Combined responses for electronic kiosk, VideOcart, video display and home shopping.

Source: *Food Marketing Institute*

Most marketers agree that electronic database marketing is still in its infancy. Willard Bishop, a consultant to the food industry, points out that, "We are just now seeing the beginnings of electronic target marketing. To say that target marketing is still in its infancy is an exaggeration. It's still too foreign as a concept for many people to grasp." (Weinstein, 1991)

Electronic marketing may not be an "overnight revolution." (Weinstein,1991) There are still a number of questions to be answered, including whether the system is cost effective for participating sponsors. Despite concerns, "Electronic marketing is sure to change the way consumers will shop in the future and the promotional behavior of food retailers." (Johnson, 1991)

ATP's "complete promotion delivery system" is a leading indicator of advertising and sales promotion trends for the nineties and beyond. As Bendinger said in *The Buzz*, "They've turned the cash register into a slot machine. They also know you like Mushroom Soup and Macaroni & Cheese. And they have your address and telephone number." (Bendinger, 1991)

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Choose from over 450 participating brands. Here are just a few:

EXHIBIT I

BEVERAGES

Coffee

Folgers
Folgers Decaffeinated

Fruit Juice & Fruit Drinks

Citrus Hill Orange Juice
Del Monte® Fruit Blends
Hawaiian Punch® Fruit Punch
Tang™ Fruit Juice Box Juice Beverage

Soft Drinks

Country Time® Drink Mixes
Crystal Light® Sugar Free Drink Mixes
Kool-Aid® Soft Drink Mixes

Vegetable Juices

Campbell's® Tomato Juice
V8 Vegetable Juice

CAKE MIXES & BAKING SUPPLIES

Mixes

Duncan Hines Cake Mixes
Duncan Hines Cookie Mixes
Duncan Hines Muffin Mixes

Canned Frosting

Duncan Hines

Shortening & Oils

Crisco Oil
Crisco Shortening
Puritan Oil

Supplies

Baker's® All Natural Semi-Sweet Chocolate Squares
Baker's® Real Semi-Sweet Chocolate Chips
Baker's® Coconut

DAIRY

Cultured Products

Breyers® Sour Cream
Breyers® Yogurt
Cheez Whiz®
Cracker Barrel® Brand Cheese
Kraft® 100% Grated Parmesan Cheese
Kraft® Singles
Light'n Lively® Cheese
Philadelphia Brand® Cream Cheese
Velveeta®

Margarine

Parkay®

FROZEN FOODS

Bagels

Lender's® Bagels

Desserts

Cool Whip® Whipped Topping
Crystal Light® Cool 'N Creamy™ Bars
Jell-O® Brand Pudding Pops®
Sealtest® Ice Cream

Dinners, Entrees

Budget Gourmet® 3-Dish Dinners
Ronzoni® Frozen Entrees

Fruits & Vegetables

Birds Eye® Classics Vegetables
Birds Eye® Deluxe Vegetables

Pizza

Tombstone® Original and Premium Frozen Pizzas

GROCERY

Barbecue Sauces

Kraft® Barbecue Sauces

Bread

Wonder® Bread

Canned Beans

Campbell's® Pork & Beans

Canned Fruits

Del Monte® Lite Fruit Cocktail

Canned Vegetables

Del Monte® Green Beans

Cereals

Ralston® Bran Chex®
Ralston® Corn Chex®
Ralston® Honey Graham Chex®

Condiments

Kraft® Real Mayonnaise

Cookies

Duncan Hines

Dry Dinners

Kraft® Deluxe Macaroni & Cheese Dinner

Pickles & Relish

Vlasic® Brand Pickles

Peanut Butter

Jif

Snacks

Pringles Potato Chips

HEALTH & BEAUTY

Analgesics

Adult Tylenol® Extra Strength
Medipren®

Antacid

Pepto-Bismol

Bar Soaps

Camay
Safeguard

Bulk Fiber Source

Metamucil

Cough and Cold Remedies

Nyquil

Deodorants

Sure

Mouthwash

Scope

Shampoo/Conditioners

Ivory
Prell

Toothpaste

Crest

HOUSEHOLD

All Purpose Cleansers

Spic and Span
Mr. Clean

Batteries

Energizer®

Bleach

Biz

Dishwashing Detergent

Cascade

Dishwashing Liquid

Dawn
Ivory Liquid

Fabric Softener

Downy

Laundry Detergent

Cheer
Tide

MEATS

Canned Meats

Bounty Canned Stews/Main Dishes
Swanson® Canned Poultry

Cold Cuts

Oscar Mayer Cold Cuts

Fresh Meats

Louis Rich Fresh Turkey

Hot Dogs and Franks

Oscar Mayer Hot Dogs
Louis Rich Turkey Franks

Meats

Louis Rich Turkey Smoked Sausage
Oscar Mayer Bacon

Smokies/Links

Oscar Mayer Smokie Links

Seafood

Louis Kemp Crab Delights

PAPER PRODUCTS

Bathroom Tissue

Banner
Charmin
White Cloud

Disposable Diapers

Luvs
Pampers

Facial Tissue

Puffs
Puffs Plus

Paper Towels

Bounty
Summit

PET FOODS

Cat Food

Purina® Kitten Chow® Brand Kitten Food
Tender Vittles®

Cat Treats

Whisker Lickin's® Brand

Dog Food

Butcher's Blend
Chuck Wagon®
Purina® Dog Chow®
Lucky Dog®
Praise®
Purina® Puppy Chow®

Dog Snacks

Purina® Biscuits

Printed in U.S.A.—8811-WBT [illegible]

EXHIBIT II

EVERYONE WINS WITH VISION'S WHEEL OF POINTS!

FREE FREE

Hand this FREE SHOPPING LIST to your cashier. Then watch the Vision Screen at check-out and win big with a spin of Vision's Wheel of Points.*

*No purchase necessary. To enter by mail please send your name, address, and telephone number to: Vision Sweepstakes 2, 628 S. Military Trail, Deerfield Beach, FL 33442

Win Free Vision Value Club Points

SCAN THIS BAR CODE

Sweepstake odds: 1 in 10 wins 1000 points, 2 in 10 wins 500 points, 3 in 10 wins 100 points, 4 in 10 wins 10 points

FREE FREE

[illegible] New [illegible]

Save 20¢ Now

BUY: *Top Job,* 28-oz. size.

SAVE: *20¢ Instantly* at check-out.

Win Free Downy Liquid

BUY: *Downy Liquid,* 64-oz. size.

1 in 10 get their *Downy Liquid Free* at check-out.

1 in 10 *Save 75¢ Instantly* at check-out.

4 in 10 *Save 50¢ Instantly* at check-out.

4 in 10 *Save 25¢ Instantly* at check-out.

Save 15¢ Now

BUY: *Mr. Turkey®* Smoked Sausage or Polish Kielbasa.

SAVE: *15¢ Instantly* at check-out.

Save 10% On Your Grocery Bill (up to $3.00)

BUY: *Tide,* 39-oz. or larger, *Cascade,* 35-oz. or larger and *Dawn,* 22-oz. or larger.

SAVE: *10% Instantly* on your entire grocery bill, up to $3.00.

25¢ Lettuce Coupon

BUY: *Crisco Oil,* 24-oz. size or larger.

GET: A *25¢ coupon* for your next purchase of lettuce, any kind.

Dahl's Foods

Good only at the following Dahl's location: 9999 University Ave., Clive.

Offers and prices may vary. All offers expire 10/31/96. Limit one each per order. Available at participating Vision Value stores only.

New Item!

vision value club

EXHIBIT III

Vision Value Club™ Card Application

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200
FREE BONUS POINTS
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Check One:
☐ I want the **Vision Card.** I will complete the front page of this application to receive **200 Bonus Points** toward valuable **free gifts.**
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VISION CARD

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To be sure we deliver values that fit you and your family's needs, please take a few minutes to answer questions 1-9.

Please print legibly.

New Card ☐ Replacement Card ☐

1. Last Name ______________________________
First Name ______________________ M.I. ________
Address ______________________________
City ______________ State ______ Zip ______________
Telephone (______) ______________________________

2. Male ☐ Female ☐

3. Date of Birth: Month ____________ Day __________ Year __________

4. How many people (including yourself) live in your household?
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more ☐

5. How many children are living at home? ______________________
Please list their birthdays below
(Month/Day/Year) ______________________________
____

6. What type of pet(s) do you have?
Dog ☐ Cat ☐ Other ☐ None ☐

7. Which of these items do you own?
Dishwasher ☐ VCR ☐ 35mm Camera ☐
Microwave ☐ Personal Computer ☐ Water Softener ☐

8. Annual Household Income: (please check one)
☐ Less than $9,999
☐ $10,000-$19,999
☐ $20,000-$29,999
☐ $30,000-$39,999
☐ $40,000-$49,999
☐ More than $50,000

9. What grocery store do you shop at most often? ______________________
Second most often? ______________________

By signing this application, I agree to allow the use of data collection and information regarding my purchases for electronic marketing purposes. I also understand that I may decline the use of this information if I so desire.

______________________________ ______________
Signature Date

ELECTRONIC CHECK (Optional)

Available when applying for Vision Card *or* Vision Visa Card.

☐ I want to participate in the electronic check option which allows me to use my **Vision Card** *or* **Vision Visa Card** as if I were writing a check. I will be issued a Personal Identification Number (PIN) so I can pay for my groceries electronically by transferring the money from my checking account to a participating retailer. **I have attached a voided check or deposit slip to the application.** I agree to be bound by the terms and conditions of such card. In connection with my use of this option, I authorize and request Central Trust to withdraw funds from my bank account listed below. The withdrawals will be to transfer such amounts from my account to accounts of participating merchants as necessary to pay for my purchases made with the electronic check card.

Name of Bank ______________________________
Bank Address ______________________________
Checking Account Number ______________________________

To the Deposit Bank: My signature below authorizes the deposit bank to honor all requests by Central Trust to withdraw funds from my account with the deposit bank. The deposit bank will not be held liable by me if it dishonors such requests for just cause. Central Trust agrees to indemnify, defend and hold the deposit bank harmless from and against any loss, liability and damage, arising out of or resulting from the deposit bank honoring any withdrawal request initiated by Central Trust.

______________________________ ______________
Applicant Signature Date

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Remember: the Vision Visa Card lets you combine your Vision Card and your Visa Card in one easy to use, easy to carry card.

I.S.

EXHIBIT IV

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All you have to do is shop at Dahl's on University Avenue in Clive.

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- Pampers
- Hostess Snacks
- Medipren

Your Vision Value Card gives you valuable points good for free gifts.

Each participating brand you buy at Dahl's is worth valuable points. In fact, for every dollar you spend on a participating brand, you'll get 20 points! And that's only the beginning. You'll also get points for the total amount you spend at Dahl's. So your points can add up fast, and you can use them to get the gifts you want… **absolutely free!**

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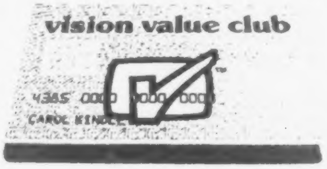
EXHIBIT IV

And it even gives you the unique Vision Card–absolutely free!

See how close you've come to the gifts you want anytime you shop–thanks to our special Vision Card.



As a member of the Vision Value Club, you'll also get a unique Vision Card. This card keeps track of your points for you. So you don't have to worry about adding or subtracting points. And there's nothing to clip, save or mail. All you do is shop like always!

It's easy to use the Vision Card, too. When you get to the check-out lane at Dahl's in Clive, just put your Vision Card into the card reader. As the clerk scans your purchases, your points will be automatically added into your card. So you can see your current point total right on the screen in the check-out lane every time you shop.

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Now you don't have to wait until you get home to check your prices! As your purchases are scanned, you'll see an electronic cash register tape that lists the name and price of each product. You'll even see special promotions on selected items right on the screen.

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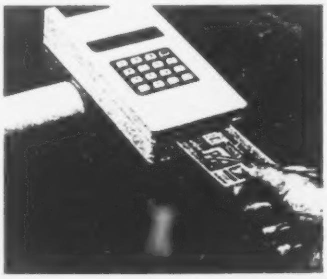


With the Vision Card, you don't have to save or mail labels. Just use your card every time you shop.

As one of the first to join this innovative new club, you'll get a special bonus. Just fill out the application and send it to us today. Your Vision Card will arrive with 200 points already on it. Then you'll be closer to earning the **free** gifts you want.

Great gifts can be yours if you join the Vision Value Club! All you have to do is purchase brand-name groceries like these, including Purina® Cat and Dog Chow, Del Monte® Ketchup, V-8 juice and Energizer® batteries.

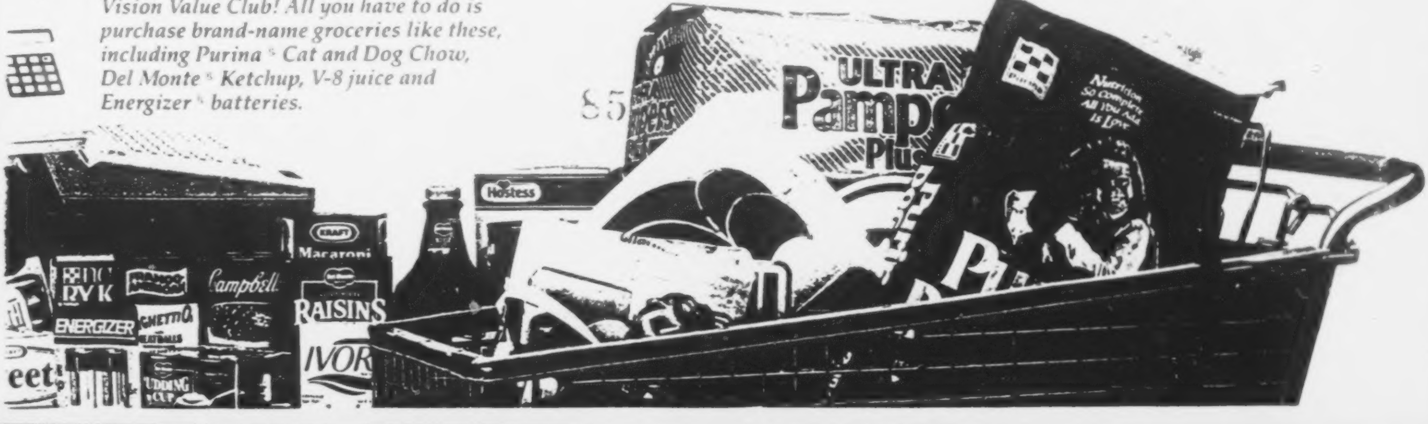
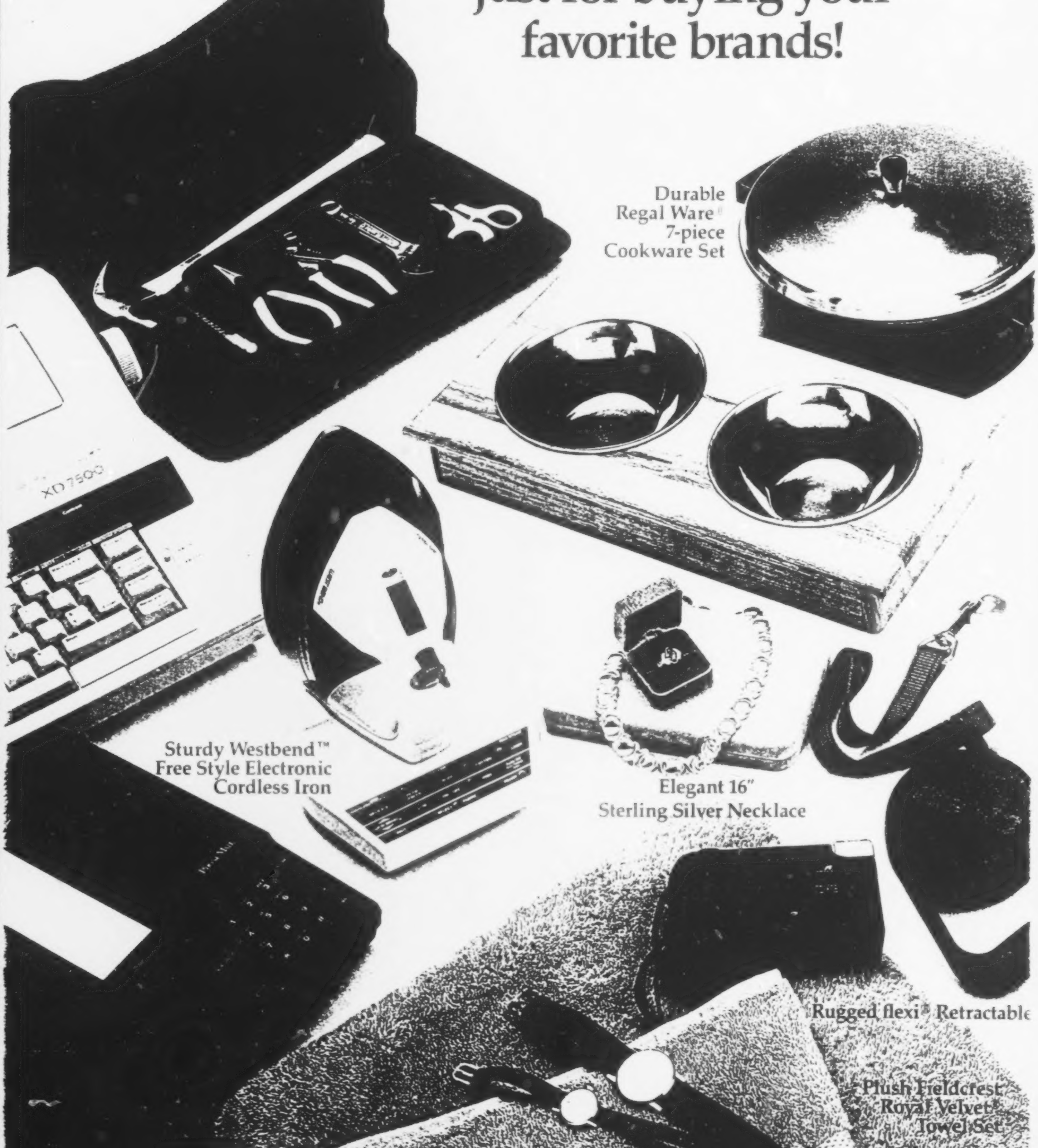


EXHIBIT IV

Introducing the only program to give you gifts like these just for buying your favorite brands!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KAY AMERT

Origins of the Garamond Style: The Roman Types of Simon de Colines

A paper presented to the
VISUAL COMMUNICATION DIVISION

Association for Education in Journalism & Mass Communication
Annual Convention: Boston, Massachusetts
August, 1991

THE GARAMOND STYLE has an indisputable significance in the history of typography. Introduced in Paris in the early decades of the sixteenth century, it remained for more than two centuries the characteristic type style in European printing. This is an important design in the modern era, as well. Revived by the American Type Founders Company in 1917, the Garamond style has since been reinterpreted many times for the gamut of twentieth-century composition technologies.(1) That this sixteenth-century letterform still serves the readers of the twentieth is itself evidence of the phenomenon of historical continuity that underlies print culture.(2)

The origins of the Garamond style are problematical and have been the subject of much debate among historians of typography. Daniel Berkeley Updike's discussion in the foundational *Printing Types, Their History, Forms, and Use*(3) emphasized the influence of Italian designs on the later French types. Updike suggested that the artist, Geofroy Tory,(4) was the vehicle of this influence, carrying an Italian Renaissance aesthetic to Paris and serving, in part by his own example as a type designer, as an impetus for the new French style. Updike implied that the eponymous Claude Garamond(5) internalized this aesthetic, subsequently producing a distinctively French variant of an Italian letterform. Updike credited Garamond with "no longer reproducing a manuscript, but creating letters to be considered independently as types."(6) The new style Updike described as "suaver" and "more rounded" than its predecessors, affecting "a certain conscious elegance" in its design.

Stanley Morison concurred with Updike's estimate of Geofroy Tory's importance, arguing in *Four Centuries of Fine Printing*, for example, that

Tory "became the most powerful European influence" in the crafts of printing and engraving.(7) As early as 1925, and later in *The Typographic Book*(8) and elsewhere, Morison linked the Garamond style to a seminal Italian roman, a type first used in 1495 in Aldus Manutius' edition of Pietro Bembo, *De Aetna*, and in revised form in the 1499 *Hypnerotomachia Poliphili*. Morison considered Claude Garamond to have been the punchcutter of prime importance in the French adaptation of the Italian style, attributing to Garamond the design of such types as the 1531–32 romans of Robert Estienne and the italics of Simon de Colines.

Beatrice Warde's research on the Garamond types, originally published in *The Fleuron* in 1926,(9) was crucial to the modern understanding of the development of the style. Warde's work established a chronology for the evolution of the Garamond style in the sixteenth and seventeenth centuries. Warde argued that Parisian developments began in 1531 with Simon de Colines' introduction of a new *gros romain*, a large text type size.(10) Warde suggested that by 1532, Robert Estienne, Christian Wechel and Antoine Augereau all had employed similar *gros romains* and related romans in their books. Of these she considered the Estienne romans to have been the most influential, and she linked Claude Garamond to the design of these types. Warde repeated Stanley Morison's contention that the Garamond style was based on that of Aldus' *De Aetna* roman. Her research established the notion that the Aldine style was first introduced in Paris in 1531 and was then copied and adopted with remarkable speed.

Another scholar with substantial knowledge of the types of the fifteenth and sixteenth centuries was A.F. Johnson. His discussion of the origins of the Garamond style in his 1928 monograph on French sixteenth-century printing(11) reflected Beatrice Warde's findings. At the same time, Johnson also published an important article in *The Fleuron* that circumscribed the influence of Geofroy Tory in these developments.(12) Johnson noted in the article that claims about Tory's work and influence were "demonstrably extravagant." He contested, in particular, the notion that Tory was a designer of types, concluding that "of direct Tory influence on French typography there is no trace."(13)

In a later book, *Type Designs, Their History and Development,*(14) Johnson again discussed the origins of the Garamond style. He repeated Warde's finding that four similar French old styles appeared in Paris around 1531. Yet he cautioned that "these four related fonts cannot have been cut by one man."(15) He concurred with Warde's conclusion that the most influential of the four romans was Robert Estienne's, but he resisted attributing the design of this roman to Claude Garamond, saying instead that Garamond "won credit with posterity for the design."(16)

In the decades following the publication of Johnson's *Type Designs*, the scholarly literature has embodied two distinguishable points of view on the origins of the Garamond style. Some writers have taken Johnson's approach, appending cautions to the attribution of these innovations to Claude Garamond.(17) Hendrik D.L. Vervliet, in an article titled "*Les Canons de Garamont, Essai sur la Formation du Caractère Romain en France au Seizième Siècle,*"(18) further noted that there is no evidence directly linking Garamond to the design of the earliest examples of the style. Arguing that Garamond's career as a punchcutter probably began too late for him to have been the originator of the style, Vervliet contended that Garamond neither designed nor cut the first *canons*, the distinctive display romans used by Robert Estienne and Simon de Colines in the 1530s. Rather, Vervliet argued, Garamond later copied the design, producing the version preserved in matrices at the Plantin-Moretus Museum. Vervliet thought that the originator of the influential *canons* was either Simon de Colines or Antoine Augereau.

Despite this, the tradition that Garamond himself originated the style has dominated the modern scholarly literature on the history of typography. Stanley Morison revised his position only slightly over the years, arguing into the 1960s that Garamond, under Tory's influence, was responsible for the principal innovations. Harry Carter, in *A View of Early Typography*,(19) also credited Geofroy Tory with the transference of an Italian model to the Parisian milieu, and Claude Garamond with the cutting of the romans used by Robert Estienne in 1531–32.

Nicolas Barker's 1974 study, "The Aldine Roman in Paris, 1530–34,"(20) reinforced this position. Barker analyzed types that appeared in books published by Simon de Colines, Robert Estienne, Christian Wechel, Antoine Augereau and Claude Chevallon. He dated the origination of the French old styles to a *gros romain* introduced by Colines in 1528, revising Warde's chronology by three years. Colines' roman he characterized, however, as an improvement on an older *gros romain*, and as such, with little influence on the practice of the period. Barker argued that the seminal French old styles were cut by Claude Garamond in 1530–31. These types, and Robert Estienne's use of them, he characterized as "revolutionary" in the sense that they established a style that Colines himself and other Parisian publishers and punchcutters quickly followed, Antoine Augereau with more originality than others. Barker tied the style of the Garamond and Augereau types directly to that of the Aldine *De Aetna* letterform, and suggested that Geofroy Tory provided Aldus' book as a model to Estienne or to Garamond.

While Barker's argument was a detailed one, it appeared to simplify the issues of influence and innovation in the origination of the Garamond style. The model for the French old styles was Italian, specifically the *De Aetna* font of Aldus Manutius. The French adaptation of this letterform was suggested by Geofroy Tory, sponsored by Robert Estienne and carried out first by Claude Garamond, and then Antoine Augereau. Other Parisian publishers, Colines and Wechel among them, quickly copied the style, and it "spread through Paris with the force of a revolution. It was a turning point in the history of typography."(21)

It is largely this understanding that is reflected in general works on the history of typography and design, and in adjacent historical and bibliographical studies. Alexander Lawson's *Anatomy of a Typeface,*(22) Philip Meggs' *A History of Graphic Design,*(23) Elizabeth Armstrong's *Robert Estienne, Royal Printer*(24) and Roger Chartier and Henri-Jean Martin's *Histoire de l'Édition Française*(25) are representative examples of current works that offer this account of the origins of the style.

SIMON DE COLINES

To date, discussion of the origins of the Garamond style has proceeded without benefit of full knowledge of the publisher Simon de Colines' type production and use. The scholarship acknowledges that Colines had important roman, italic and Greek types, and his name and work surface repeatedly in discussions of the Garamond style. However, the literature is vague on the question of whether Colines was himself a type designer and punchcutter. It is yet less clear on the nature of the types that Colines used, and on when they appeared in his books.

There are several reasons for this lack of clarity, not least that Colines' accomplishments have been partially eclipsed by those of the better-known Estienne family. Accounts of the Estiennes(26) mention the fact that Colines took over the Estienne press in 1520 following the death of Henri I, and that he subsequently married Guyonne Viart, Henri Estienne's widow. Colines is known to have reared the Estienne children, including Robert Estienne, whom he trained as a press corrector in the workshop on the rue Saint-Jean de Beauvais. Colines tripled the annual production of the press, and in 1526 moved to new quarters, leaving the original Estienne shop and house to his step-son, Robert Estienne.

Some of the literature on the Estiennes portrays the relationship between Simon de Colines and Robert Estienne as a hostile or competitive one.(27) This is a dramatic construction, but it is one that is based on slim and ambiguous evidence. It pervades some discussions of the origins of the Garamond style.(28) This and other assumptions about Colines' relation to the Estienne family potentially hamper understanding of the respective achievements of two of the most eminent scholar-printers of the era.

Perhaps the most formidable impediment to scholarly acquaintance with Colines' work is a practical one, that is, the extent of his work as a publisher and printer. Between 1520 and his death in 1546, Colines produced more than 700 separate editions. The surviving exemplars are today widely dispersed, making systematic study of his work difficult.

Nevertheless, there are sound reasons for examining Colines' production and use of type. As A.F. Johnson demonstrated in his article, "The Supply of Types in the Sixteenth Century,"(29) the number of punchcutters at work in Europe during this era was very small. Harry Carter emphasized this point, as well in his *View of Early Typography*.(30) If Colines was in fact one of those few punchcutters, it is important to know the nature and extent of his production, particularly because he has been closely linked to the origins of the Garamond style.

Much of the evidence for Colines' work as a punchcutter leaves room for two interpretations of its meaning. The Latin of Colines' colophons, for example, is specific in its indication that the types used in his books are his own. From 1524, some of the colophons include the phrase, "*suis typis*" ([in] "his own types"); others, "*suis typis nitidissimis*" ([in] "his own most sparkling types"). The colophons do not, however, indicate that Colines was in fact the *tailleur*, the cutter of the designs, leaving open the possibility that Colines commissioned from others the cutting of proprietary types, in much the same way that Aldus commissioned Francesco Griffo to cut his typefaces.

Several literary tributes to Colines' use of types survive from his own era. Some of the verbs in these tributes ("*sculpit*," for example) indicate agency in the cutting of types. However, the entire genre of the poetic tribute was notoriously grand and hyperbolic during this era. The poets Nicolas Bourbon, Jean Faciot ("Vulteius") and Herbert Sussaneau may simply have intended praise for the quality of Colines' typography. When Regnault and Claude Chaudière, two of Colines' successors, assured readers that they would continue to use the types of Simon de Colines, they spoke in prefaces to their books of the "*elegance et beaulté*" of the designs. Yet this again leaves open the possibility of Colines' simple ownership, rather than authorship of the designs.

Preserved in the Bibliothèque Nationale, the inventory of the Le Bé foundry, unpublished until 1957,(31) and the Le Bé memorandum, first published a decade later in 1967,(32) are two of the oldest surviving documents related to the history of punchcutting and typefounding. The inventory attributes three sets of matrices in the Le Bé foundry collection to Colines, suggesting his agency in the cutting of the types. The Le Bé memorandum also discusses Colines as an "expert in types," according him the reputation of being "the man who, up to that time, had made the best types as well as . . . printing correct editions."(33)

While some scholars have chosen to discount the significance of the Le Bé evidence, others have considered it credible. Jeanne Veyrin-Forrer, for example, in her essay on Colines in the *Dictionnaire de Biographie Française*,(34) said that Colines played a crucial role in the origination of the Garamond style, and that he probably furnished types to his step-son, Robert Estienne. Based on acquaintance with the books of the period, other scholars have suspected that Colines may have begun to improve his roman types before the period of the Garamond "revolution." A.F. Johnson, for example, made this intriguing observation in his *Type Designs*: "Colines seems to have been experimenting with the design of roman for some years . . . . Even as early as 1525 the roman in which the first Tory Book of Hours is printed is an advance on the types which Colines had acquired from Henri Estienne."(35)

This paper discusses one dimension of Colines' work, the roman text types appearing in his books in the first half of his career, up to 1533. It discusses the roman fonts that Colines inherited from Henri Estienne, since these designs initially constituted Colines' typographic repertoire and were later modified or replaced by him. It comments on initial letters, titling fonts and non-roman types introduced by Colines during this period, as context for the discussion of the romans. The paper does not resolve the question of the authorship of these designs, nor does it examine their relation to other types of similar design.

Philippe Renouard's *Bibliographie des Éditions de Simon de Colines*(36) provided the groundwork for this research. The bibliography identifies and describes more than 700 editions published by Colines from 1520–46. To date, I have located examples 250 of these editions in European and American libraries, and have examined as well a dozen Colines titles that were unknown to Renouard.(37) In the text of the paper, I have modernized the spelling of authors' names and shortened the long Latin and French titles of Colines' books. When a specific title is mentioned in the text, an endnote provides a reference to Renouard's discussion of the book and the shelfmark of the copies consulted.

HENRI ESTIENNE ROMANS

Colines first employed types and woodcut initials that had been Henri Estienne's. This material included two sets of woodcut titling capitals, a large number of *criblé* initials in five sizes, blackletter types in three sizes and roman designs in four text sizes. Harry Carter commented in *A View of Early Typography* that the Estienne romans were "good types, and when De Colines began printing about 1520, they were better than any in Paris."(38) Some of the same romans also served Robert Estienne when he began in 1526 to produce books under his own imprint.

The Estienne romans are a related suite and the four types display many stylistic similarities. All are Venetian old styles(39) and all have considerable weight and color on the page. The capitals are the full height of the ascending lowercase letters, and both the lowercase and capital letters are generous in width. The capitals do not follow the proportions and widths of classical inscriptional letterforms, but rather are uniformly wide and carry slab serifs. The x-heights of the types are relatively tall for a group of Venetian old styles, and the ascenders and descenders are correspondingly short. The fonts in all four sizes are ample: they include lowercase, capital and small capitals forms, old style numerals, punctuation marks, accented characters, abbreviations, ligatures and occasionally variant lowercase letterforms. The baseline alignment of the characters is not as true as that found, for example, in some of the Italian types of the late incunabula period and the early sixteenth century. The lateral "fit" of the letterforms varies from one type size to the next: the largest size is relatively tightly fitted, while the smaller sizes incorporate proportionately more white space at the sides of the characters.

GROS ROMAIN (1520)

The largest of the Henri Estienne romans is a *gros romain*.(40) It is a fourteen point type by modern standards,(41) measuring 102 mm./20 lines.(42) The *gros romain* is compactly fitted and tightly cast on its body. Colines quickly recast the type on a deeper body (107 mm./20 lines), lending his *gros romain* pages a lighter look. The *gros romain* used in Aristotle, *Problematum Sectiones*,(43) a folio of 1524, shows the effect of the deeper body.

Colines used the *gros romain* principally as a text type in folio volumes. It is used, for example, as the text type in the 1522 Jacques Lefèvre, *Commentarii Initiatorii in Quatuor Evangelia.*(44) Colines also put the *gros romain* capitals to use in the title pages of the sextodecimo volumes he began to publish in the early 1520s. The sextodecimo Bible series, for example, shows this use of the *gros romain*. Colines occasionally used the *gros romain* as a secondary text type in editions in other formats. The 1527 octavo Probus, *De Scripturis Antiquis*,(45) for example, contains in the frontmatter an address to the reader that is set in the *gros romain*. Colines' uses of the *gros romain* began to dwindle after 1526, with the introduction of the new *saint augustin* discussed below. Colines' new *gros romain* of 1528 ultimately replaced all uses of the older Estienne roman.

SAINT AUGUSTIN (1520)

The second of the Henri Estienne romans is a *saint augustin*, a thirteen point type measuring 92 mm./20 lines. Colines made limited use of this type, and that principally in the early years of his production. In these uses, it appears as a text type in both folio and quarto volumes. The Montholon, *Promptuarium* of 1520,(46) a substantial two-volume work underway at the press at the time of Henri Estienne's death, shows Colines' earliest use of the type in a folio format. The octavo first edition of Clichtove, *De Veneratione Sanctorum*(47) of 1523 offers a late example of Colines' use of the *saint augustin* in its original state.

PHILOSOPHIE (1520)

The third of the Henri Estienne romans used by Simon de Colines is a *philosophie*, an eleven point type measuring 81 mm./20 lines. Colines initially used this roman for marginalia in folio and quarto editions. The design of the type was revised and the font recast on a tighter body in the early 1520s. Aristotle, *Decem Libri Ethicorum*,(48) an octavo of 1524, offers an example of this revision, the *philosophie* measuring 78.5 mm./20 lines.

Colines later made many uses of this type as the text face in octavo format editions. An octavo series of classical Latin prose writers produced in the 1520s, for example, uses the *philosophie* again cast at its original depth (81 mm./20 lines). The 1523 Sallust(49) and the 1525 Cicero(50) are examples from this series. They share a common title border and initial letter style, and both employ the revised *philosophie* as a text type.

PETIT TEXTE (1520)

The last of the Henri Estienne romans used by Colines is a *petit texte*. It is a nine point type by modern standards and it measures 63 mm./20 lines. Colines often used this small roman as a marginalia face in folio and smaller format volumes. The Clichtove, *Secunda Emissio*,(51) a folio of 1521, contains a representative example of this use of the *petit texte*.

A far more important use of this type, however, came with its adaptation as the text face in Colines' sextodecimo publications. The nine-volume miniature Bible series of 1522–44, a staple of Colines' publication program, consistently used this type. The 1522 sextodecimo *Pauli Apostoli Epistolae*(52) provides an early example of this use of the *petit texte*. In some locales, the *petit texte* size was known as *colinaeus*, a coinage that probably reveals the influence of Colines' use of a small roman type for the composition of the Bible.

COLINES ROMANS

During the years 1520–26, Colines substantially increased production at the press, and added as well to its typographic repertoire. A new group of *criblé* initials appears in the books from this period, replacing the older Estienne material. These initials bear roman capitals that are more inscriptional in appearance, more classical in proportion and more skillfully cut than those of the older initials. A new foundry titling face also appears in the Colines books from this period, and one of the Estienne woodcut titling faces was recut, producing two new titling fonts. One is a set of plain capitals, considerably lighter in weight than the original letters; the other is an inline design that Colines used extensively in his octavo and sextodecimo editions.

MIGNONNE (1526)

After relocating his press to a new workshop, it appears that Colines turned his attention to the problem of filling out his range of roman type sizes. By 1526, a new *mignonne*, a seven point type by modern standards, appears in his work. The type was visually compatible with the older romans, but its design also incorporated some important stylistic departures from the Estienne types. The capitals, for example, are scaled down and are shorter than the height of the ascending lowercase letters. The capitals are classical in their proportions and lack the slab serifs that characterize the Estienne romans. Despite the small size of the type, the alignment, too, is markedly better than that of the older romans. The font of the *mignonne*, while not as large as that of the Estienne romans, nevertheless includes lowercase, capital and small capital forms, plus numerals, punctuation and basic ligatures, including "st," "ct" and "Qu" forms.

Cutting punches for a small type is a challenging task: the x-height of the *mignonne*, for example, is only three points tall. The punches for the type appear to have been cut with great confidence, the character of the tiny counterpunches confirming this expertise. Like those of the Estienne romans, the counterforms in the printed *mignonne* are handsome and together comprise a harmonious group of shapes, including a markedly smaller bowl at the top of the lower case "g."

Colines first used the *mignonne* for illustration cutlines in his science and mathematics folios. The 1526 folio Sarzosus, *In Aequatorum Planetorum*,(53) for example, shows an early use of this kind, as does the 1526 folio *Monalosphaerium* of Jean Fernel.(54) Both books were part of Colines' new mathematics and science series, and both employ an Oronce Finé title border with miniature portraits and allegorical figures. Colines also made some use of the *mignonne* as a secondary text face in his sextodecimo editions. The 1527 edition of the Pentateuch from the miniature Bible series,(55) for example, employs the *mignonne* for its preface.

SAINT AUGUSTIN (1526)

A new *saint augustin* first employed by Colines by 1526, and possibly earlier, is also a type design of great interest. This is a thirteen+ point type by modern standards, and it measures 90mm./20 lines. The size of this roman is similar to that of the Estienne *saint augustin* (92 mm./20 lines), and the new type may have been intended as a replacement for that face.

The new design retains some of the features of the Estienne Venetian old styles: the x-height, for example, is comparably large and the ascenders and descenders short. The crossbar of the lowercase "e" is still slightly canted. However in many other design features, this type embodies important stylistic innovations. The weight of the type, for example, is considerably lighter than that of the Estienne romans, with a stem width to x-height ratio of approximately 1 : 5. The top serifs of the lowercase letters are oblique and most are bracketed to the stems. The terminals of letterforms "c," "f" and "r" are rounded, a design feature that anticipates later developments in type design. The capitals are shorter than the height of ascending lowercase characters. The number of characters in the font is greater than that of the Estienne romans, containing lowercase, capital and small capital forms, punctuation, ligatures, abbreviations and many accented characters including grave, acute and circumflex variants for most of the vowels.

An early use of the new *saint augustin* occurs in the 1526 folio Siliceus, *Arithmetica*(56): the type is here used in the frontmatter, both for an address to the reader and a dedicatory essay. Colines later used the type for entire texts, as in the 1526 quarto *De Sacramento Eucharistiae.*(57)

This design of the *saint augustin* was revised over time. The 1527 folio Aristotle, *Ethica,*(58) for example, employs the revised *saint augustin* as its text type. Some of the lowercase characters were recut (the lowercase "g" is an example), and the design improved over the initial state of the font.

This and other types used by Colines are more accurately characterized as "states" than as fixed type designs. The design of both the Estienne types and of Colines' new romans were revised in stages, a process that suggests vigilant assessment of the appearance of the types and continuing efforts to improve their aspect on the page. Economy of space and related concerns do not appear to have played a role in this process. For example, Colines consistently deepened the bodies on which the romans were cast, and increased the widths of the sorts that accommodated individual letterforms. Both changes decreased, rather than increased the spatial economy of the types.

The motive for these revisions appears instead to have been an aesthetic one. Many of the changes lightened the color of the types on the page.

Revisions involving alteration of the form of individual letters appear to have been directed largely toward furthering the internal consistency of the designs. In some cases the visual difference between one state of a design and another is subtle and perceptible only with careful scrutiny. In others, particularly those changes related to the "fit" of the characters, the visual difference between states can appear to be so great as to sugggest the existence of a new type design. The progressive states of Colines' romans can confound the historian, but they also reveal much about the subtleties of type design in this period.

In the same year the *mignonne* and *saint augustin* appear in Colines' work, a new group of *criblé* initials also appears in the books, replacing a second of the Estienne *criblé* initials sizes. In the following year, 1527, Colines added a lively set of woodcut titling capitals to his repertoire, along with a third new set of *criblé* initials. These initials are related in design and the quality of their craftsmanship to the other new *criblé* initials. They were, however, produced in a new size. That size was compatible with the sizes of two new roman types that both make their first appearance in the following year, the one a *gros romain*, the other a *cicéro*, roughly a twelve-point type size.

GROS ROMAIN (1528)

Colines' new *gros romain* of 1528 is a sixteen+ point letterform by modern standards, measuring 117 mm./20 lines. The capitals are predominantly classical in proportion and are shorter than most of the ascending lowercase characters. Certain inscriptional features are carried into the design of the capitals: the "P," for example, has an open bowl, the "R" a long tail and the "A" a pointed apex.

The vertical stems in the design are narrow in width. The stems of the lowercase letters are slightly flared toward the tops of the ascenders and the bottoms of the descenders. This treatment reflects a calligraphic practice, and the design shares this feature with both earlier Italian and contemporary French Venetian old styles. The design of the *gros romain* carries this treatment a step further, however, locating the slimmest part of the stems in the area between the baseline and the x-height of the forms. This places the counterforms of bowled letters in an unusual relation to the stems: many of the counterforms cut into the stems. The stem widths of other letters are similarly slim in the areas between the x-height and baseline. This technique is decidedly non-calligraphic in orientation. It substantially reduces the apparent weight of the letterforms and lightens their color on the page.

The punctuation in the *gros romain* font is idiosyncratic: the period is a large diamond-shaped cluster of four separate points; the colon doubles this design; and the comma, while traditional in form, is noticeably large in the type lines. The baseline alignment of the design is excellent. The lateral fit of the letterforms is markedly tight: in most cases, barely a stem width of white space intervenes between pairs of letters. Like other Estienne and Colines romans, the font for the new *gros romain* is a large one. It contains lowercase, capital and small capitals forms, numerals, punctuation, ligatures, abbreviations and accented sorts.

Colines first used the new *gros romain* in the frontmatter of his octavo and folio editions. The 1528 octavo Erasmus, *De Recta Latini Graecique Sermonis,*(59) contains a dedicatory essay set in the new *gros romain*; the 1528 octavo Galen, *Definitiones Medicae*(60) also makes use of the new type in its frontmatter. Lefèvre and Clichtove's *In Ethicen Introductiones,*(61) a folio completed in August, 1528, uses the new *gros romain* for its preface, while the older Estienne *gros romain* appears as the text type. A similar use of the two *gros romains* occurs in another folio published late in 1528, Jean Fernel, *De Proportionibus.*(62) As he had with the Estienne *gros romain,* Colines used the capitals from the new font on the title pages of many of the sextodecimo editions he published in the late 1520s.

By 1531, the design of the new *gros romain* had been revised. Some of the lowercase characters were completely recut. The counterforms of the lowercase "a" were remodelled; the lowercase "b" and "u" gained oblique serifs with angles similar to those of other characters; the lowercase "e" was given a horizontal crossbar; the form of the "s" was simplified; and the "t" gained some width. The font's punctuation was normalized. Most of these changes seem to have been directed toward improving the internal consistency of the design and eliminating idiosyncratic features. The type was refitted and cast on a slightly deeper body measuring 119 mm./20 lines, both changes further lightening the appearance of the type on the page.

The 1531 folio Galen, *De Anatomicis Administrationibus,*(63) employs the revised *gros romain* as its text type. Pierre Martyr, *Extraict ou Recueil des Ilses Nouvellement*(64) with a vernacular text, offers another example of the use of the new *gros romain* in this state.

By the following year the design of the *gros romain* was again revised. Several additional lowercase characters, including the font's "m" and "p," were recut. The design of the font's punctuation marks was again revised.

More significantly, the type was refitted with substantially more white space introduced between the letterforms. This change had a dramatic visual impact and lent the *gros romain* a much lighter appearance on the page.

The folio volumes, Galen, *De Pulsibus*(65) of 1532 and Aristotle, *De Historia Animalium*(66) of 1533 both show early uses of this third state of the *gros romain*. A Colines title unrecorded by Renouard, Claude de Viexmont, *Methodus Confessionis*(67) of 1533 contains an interesting use of the third state of this type in a quarto volume: the *gros romain* is presented in interlinear fashion with the *mignonne* discussed above.

The three states of the *gros romain* are of considerable interest. The initial state of the design carried forward experiments begun in Colines' *saint augustin*, incorporating significant departures from both earlier Italian and contemporary French type design practices. The design in this state contained internal inconsistencies and idiosyncracies, problems addressed in the revisions that resulted in the second state of the font. The final revision addressed principally the presentation of the letterforms, their lateral relation to each other in words and lines. It dramatically improved the appearance and legibility of the type.

Colines seems to have used the *gros romain* in its third state throughout the remainder of his career as a publisher. The 1543 quarto *Horae*,(68) for example, uses this state of the *gros romain*. Both the 1545 Latin(69) and the 1546 French-language folios, Charles Estienne, *La Dissection des Parties du Corps Humain*(70) show uses of the *gros romain* in its final form.

CICÉRO (1528)

Another new roman also appears in books published by Simon de Colines in 1528. This is a *cicéro*, a size that, like the *mignonne*, was an addition to the original group of Estienne roman type sizes. It is a twelve+ point type by modern standards, measuring 88 mm./20 lines. The design of the type bears a close relation to the design of the first state of the *gros romain*. It is a considerably lighter letterform than the Estienne romans. The lowercase letters have oblique and slightly bracketed serifs, and longer ascenders and descenders than the older romans. This design, like the *gros romain*, reveals some slimming of the stems of the letters in the area between the baseline and x-height of the characters. The design is extremely tightly fitted, with less than one stem width of white space intervening between some pairs of letterforms. The font is again a very large one, including small capitals and many accented characters.

The earliest uses of the *cicéro* that I have found in Colines' work occur in the context of the first uses of his new Greek type. The Greek translation of Cicero's *De Senectute*(71) and the Greek edition of the tragedies of Sophocles,(72) both octavos of 1528, each make use of small amounts of the *cicéro* on their title pages. A more extensive use of the *cicéro* is found in the Themistius paraphrases of Artistotle, *Themistii Euphiadae in Libros Quindecim Aristotelis*.(73) The text of this folio volume is composed in the new *cicéro*, and it is accompanied by Colines' *gros romain* in its first state.

By 1533 the design of the *cicéro* had been revised and some of the lowercase characters recut. The lowercase "e," for example, was recut with a horizontal, rather than a canted, crossbar. The weight of certain characters appears to have been lightened, perhaps indicating modification of the punches. The type was refitted but remained cast on a body identical to that of the first state. Oribasius, *Commentaria in Aphorismos Hippocratis,*(74) an octavo of 1533, shows the second state of the *cicéro* used here as its text type, as does the octavo Leonardus Bruni, *De Bello Italico,*(75) published the following year.

By the mid-1530s, the *cicéro* appears in a third state, recast on a deeper body measuring 91 mm./20 lines. The 1536 Oronce Finé folio, *In Sex Priores Libros Geometricorum Elementorum*(76) employs this state of the *cicéro* in its commentaries. The 1536 octavo Jean Perion, *Oratio . . . de Laudibus*(77) employs the third state of the *cicéro* as its text type.

In addition to the *gros romain* and *cicéro* mentioned above, a number of other new types appear in books published by Colines between 1528–1533. The accented Greek type of 1528 was the first significant Greek font cut in Paris, and its design contained many improvements over the Aldine Greek font. Five new italic types date from the 1528–33 period. While the number of Colines' italics is usually given as three, including two *cicéros* and a *gros romain*, the study has turned up a *petit texte* and a *mignonne*, as well. In addition, Colines introduced two new sets of woodcut initials, one inline and one plain, along with a titling font of roman capitals by 1529. The form and fit of the *philosophie* and the *petit texte* romans also were revised by 1533.

CONCLUSIONS

One of the most striking findings of this research is the extent of the type-related activity that is revealed in the context of Colines' books. Henri Estienne's romans were remodeled, refitted and recast on deeper bodies. Four new roman types were introduced between 1526–28. Three of these designs were revised and improved in a staged process that took several years. If one adds to a tally of the romans the number of new italic, Greek, initial letter and titling fonts that appear in Colines' work during this period, the combined total of new type designs is unexpectedly large. It may begin to explain the stature accorded to Colines in the Le Bé memorandum.

The design and casting of new types in Colines' shop began by 1522 and continued into the 1540s. Of the period covered in this paper, the years 1528–32 were a time of particularly intense activity. Clearly Colines' foremost interest lay in the design and casting of types for his own use: the distinction of his typefaces served his aesthetic and commercial purposes as a publisher. This kind of activity is consistent with Elizabeth Eisenstein's notion of the acceleration of graphic and textual innovation in the publishing trade of the sixteenth century.(78)

Yet the character of Colines' type production is also redolent of the incunabula era, a period in which, in Konrad Haebler's words, "each printer strove by means of some peculiarity to keep a certain individuality in his types."(79) Haebler,(80) Carter(81) and others have noted that French printing of the incunabula era and the early decades of the sixteenth century was atypical: it exhibited considerably less diversity in typographical form than did printing elsewhere on the continent. The matrices and types used in Paris during this period were largely imported from a small number of printers and punchcutters working in Italy, Basle and elsewhere. Within just a few decades, this situation had radically changed. French printers and others bought matrices or types from such independent resident punchcutters as Claude Garamond, and from local foundries like that of the Le Bé family. Colines' in-house production of types represents an interesting middle ground between the earlier practice of importing types and the later practice of purchase and export from independent foundries. Colines' success in type production may have helped to establish punchcutting and typefounding as indigenous crafts in the Parisian milieu.

Was Colines himself actually a punchcutter? Considering the evidence from contemporary sources and the Le Bé documents, and adding to it observations on patterns in the production and use of types in his workshop, it seems probable that he was.

The study unearthed several Colines romans that are unknown or barely discussed in the literature on the history of typography. The existence of the 1526 *mignonne*, for example, has not been acknowledged, although the Le Bé inventory does mention a *mignonne* that it calls Colines'. Neither is the 1526 *saint augustin* a design that has been discussed in the literature. This is a type that deserves attention, not as much for the merit of its cut, but rather because it is a clear harbinger of the mature Garamond style.

Colines' 1528 *gros romain* probably needs to be understood in terms different from those applied in even the most detailed of studies to date. The *gros romain* is a completely fresh design, rather than a revision of the older Estienne *gros romain*. The second state of the *gros romain* has been taken as a revision that brought Colines' design closer to that of Robert Estienne's *gros romain*. Indeed the two faces bear an extraordinary similarity to each other, but to construe Colines' as a copy of Estienne's is to miss the significance of the first state of the design.

Colines' *cicéro* is a related roman that is acknowledged in the literature, but usually as a design introduced in the 1530s. In fact it was first used in 1528, in the same year the first of the *cicéro* italics and the *gros romain* appeared in Colines' books. Altogether, these findings confirm A.F. Johnson's suspicion that Colines had been experimenting with roman for some years before 1531.

Updike commented that the type designs of this period were no longer based on manuscript letters, but rather were considered independently as types. Stanley Morison often made a parallel assertion, suggesting that types in this period began to exert their true character in response to engraving, the technology of their making. Colines' pattern of remodeling, reworking and relating both old and new designs puts a new twist on the meaning of these words. From the outset equipped with the best roman types in Paris, Colines initially recast these letterforms on deeper bodies to lighten their look on the page. The features of the new *mignonne* and *saint augustin* of 1526 respond principally to those of the older Estienne romans, at the same time they move toward a new visual configuration. The nature of that configuration is more clearly stated in the 1528 *gros romain* and *cicéro* designs, both of which in turn were revised and improved in the years following their first uses.

This design process does not appear to have involved reliance on an Aldine model. Rather it seems to descend directly from the design of earlier French romans, types that bear Venetian old style characteristics. The direction of the shift in the features of Colines' romans parallels that of the Aldine innovations, yet it appears to have taken an independent course. At least in the case of Colines, the movement toward a lighter and more elegant letterform seems to have come about in an evolutionary, rather than a revolutionary way.

ENDNOTES

1. Alexander Lawson. *Anatomy of a Typeface*. Boston: David R. Godine, 1990, pp. 129–40.

2. For discussion of the features of print culture, see, for example, Elizabeth Eisenstein, *The Printing Press as an Agent of Change, Communications and Cultural Transformations in Early-Modern Europe* (Cambridge: Cambridge University Press, 1979) and Walter Ong, *Orality and Literacy, The Technologizing of the Word* (London: Methuen, 1982).

3. Daniel Berkeley Updike. *Printing Types, Their History, Forms, and Use*. Cambridge: Harvard University Press, 1922. Facsimile of 1937 edition: New York: Dover Publications, 1980.

4. d. 1533. Updike's and later scholarly assertions about Tory's influence were based on claims made by Auguste Bernard in a biography of Tory. Originally published in French in 1857, the text was reissued in an English translation by George B. Ives as *Geofroy Tory, Painter and Engraver, First Royal Printer, Reformer of Orthography and Typography Under François I* (Cambridge: Riverside Press, 1909).

5. d. 1561. This paper uses the anglicized "Garamond" for a name that was originally spelled "Garamont."

6. *Printing Types*, p. 234.

7. Stanley Morison. *Four Centuries of Fine Printing*. New York: Barnes and Noble, 1960, p. 29.

8. Stanley Morison. *The Typographic Book, 1450–1935, A Study of Fine Typography Through Five Centuries*. Chicago: University of Chicago Press, 1963.

9. Paul Beaujon (pseudonym). "The Garamond Types, Sixteenth and Seventeenth Century Sources Considered." *The Fleuron*, v (1926), pp. 131-79. Reprinted in Sir Francis Meynell and Herbert Simon, editors, *Fleuron Anthology* (Boston: David R. Godine, 1979).

10. This paper uses the contemporary French terms for type sizes. For discussion of the literature and a review of historical and modern terms for type sizes, see John Richardson Jr., "Correlated Type Sizes and Names

for the Fifteenth Through Twentieth Century," in *Studies in Bibliography* (Charlottesville, Virginia: The Bibliographical Society of the University of Virginia, v. 43, 1990, pp. 251–72).

11. Alfred F. Johnson. *French Sixteenth Century Printing*. London: Ernest Benn, 1928.

12. Alfred F. Johnson. "Geofroy Tory," (1928) in *Selected Essays on Books and Printing*. Amsterdam: Van Gendt, 1970, pp. 166–89. Reprinted in the *Fleuron Anthology* (see n. 9 above).

13. Ibid., p. 187.

14. Alfred F. Johnson. *Type Designs, Their History and Development*. London: Grafton, 1934.

15. Ibid., p. 62-64.

16. Ibid., p. 64.

17. See, for example, Robert Brun, *La Typographie en France au Seizième Siècle* (Paris: Bibliothèque Nationale, 1938).

18. Hendrik D.L. Vervliet. "*Les Canons de Garamont, Essai sur la Formation du Caractère Romain en France au Seizième Siècle*," in *Refugium Animae Bibliotheca*. Wiesbaden: Guido Pressler, 1969, pp. 481–500.

19. Harry Carter. *A View of Early Typography up to About 1600*. Oxford: Clarendon Press, 1969.

20. Nicolas Barker. "The Aldine Romans in Paris, 1530-1534,"*The Library*, Fifth Series, Vol. XXIX, No. 1, March, 1974, pp. 5-32.

21. Ibid., p. 6.

22. See n. 1 above.

23. Philip B. Meggs. *A History of Graphic Design*. New York: Van Nostrand Reinhold, 1983.

24. Elizabeth Armstrong. *Robert Estienne, Royal Printer*. The Sutton Courtenay Press, 1986. (Revised edition.)

25. Roger Chartier and Henri-Jean Martin. *Histoire de l'Édition Française*. Paris: Fayard/Promodis, 1989. (Revised edition.)

26. See, for example, Mark Pattison, "The Stephenses," in *Essays* (Oxford: Clarendon Press, 1889). Bibliographical works on the Estiennes include A.A. Renouard, *Annales de l'Imprimerie des Estiennes* (Paris: Jules Renouard, 1837–38) and Fred Schreiber, *The Estiennes* (New York: E.K. Schreiber, 1982).

27. See, for example, Elizabeth Armstrong, *Robert Estienne, Royal Printer* (n. 24 above).

28. See, for example, Nicolas Barker, "The Aldine Roman in Paris, 1530–34" (n. 20 above).

29. Alfred F. Johnson. "The Supply of Types in the Sixteenth Century," (1943) in *Selected Essays on Books and Printing* (see n. 12 above), pp. 146–60.

30. *A View of Early Typography*, p. 11, p. 66 and elsewhere.

31. Stanley Morison, editor. *L'Inventaire de la Fonderie Le Bé*. Paris: Documents Typographique Français I, 1957.

32. Harry Carter, editor. *Sixteenth-Century French Typefounders: The Le Bé Memorandum*. Paris: Documents Typographique Français III, 1967.

33. Ibid., p. 28.

34. Jeanne Veyrin-Forrer. "Simon de Colines," in the *Dictionnaire de Biographie Française*. Paris: Centre Nationale de la Recherche Scientifique, Tome Neuvième, 1961, cols. 244–248.

35. *Type Designs*, p. 62.

36. Philippe Renouard. *Bibliographie des Éditions de Simon de Colines 1520-1546*. Paris: Bibliothèque Nationale, 1894.

37. The scholar/bookseller Fred Schreiber recently gathered the largest American collection of Colines imprints, including a dozen titles that were unknown to Renouard. That collection is now at the Harold B. Lee Library of Brigham Young University. My thanks to Associate University Librarian Dean Larsen for permission to study materials in the collection while its cataloguing was in progress.

38. *A View of Early Typography*, p. 84.

39. The type classification terminology used in the paper follows that proposed by Alexander Lawson in *Printing Types, An Introduction* (Boston: Beacon Press, 1971) and used in *Anatomy of a Typeface* (see n. 1 above).

40. Harry Carter indicates in *A View of Early Typography* that a typical *gros romain* might measure 122 mm./20 lines. Henri Estienne's type, while a *gros romain* in the context of the period, is modest in scale.

41. Equivalent sizes based on the American Point System are given to facilitate reference to modern practice.

42. This and subsequent measurements describe the depth of twenty type lines in millimeters. For a discussion of the benefits and problems associated with this tradition of measurement, see Thomas Tansell, "The Identification of Type Faces in Bibliographic Description," *Papers of the Bibliographical Society of America*, v. lx, 1966, pp. 185-202.

43. Renouard, pp. 57-58. Copies consulted: British Library, 985.h.2 (2); Harold B. Lee Library, Brigham Young University (catalogue in progress).

44. Renouard, pp. 36-38. Copies consulted: British Library, 1355.k.12; Newberry Library, Wing fZP539 C666; Harold B. Lee Library, Brigham Young University (catalogue in progress).

45. Renouard, p. 103. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

46. Renouard, pp. 8-10. Copies consulted: British Library, C.78.f.I; Bibliothèque Mazarine, 3.213 C-D (folio); Harold B. Lee Library, Brigham Young University (catalogue in progress).

47. Renouard, pp. 46-47. Copy consulted: Bibliothèque Mazarine, 19.166 p. 2.

48. Renouard, p. 29. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

49. Renouard, p. 55. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

50. Renouard, p. 71. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

51. Renouard, pp. 17-18. Copy consulted: Bibliothèque Mazarine, 1129c (folio).

52. Renouard, pp. 32-34. Copy consulted: Bibliothèque Sainte-Geneviève, A8vo 538 *Rés*.

53. Renouard, p. 91. Copy consulted: British Library 533.i.3 (4).

54. Renouard, pp. 85-85. Copy consulted: British Library 533.i.3 (2). The colophon indicates that the production of the book was not completed until March, 1527.

55. Renouard, p. 94. Copies consulted: British Library 219.a.15; Harold B. Lee Library, Brigham Young University (catalogue in progress).

56. Renouard, p. 89-91. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

57. Renouard, pp. 82-83. Copy consulted: Bibliothèque Sainte-Geneviève, D.4to. 1847, *inv*. 2034 *Rés*. The colophon indicates that the date of completion was actually March, 1527, n.s.

58. Renouard, pp. 93-94. Copies consulted: Bibliothèque Mazarine, 3618A (Folio); Harold B. Lee Library, Brigham Young University (catalogue in progress). The colophon indicates that the actual date of completion was July 3, 1528.

59. Renouard, pp. 114-15. Copies consulted: British Library, C.48.e.10; Newberry Library, Case 3A 1456.

60. Renouard, p. 119. Copy consulted: British Library, 540.b.12 (2).

61. Renouard, pp. 115-16. Copy consulted: Bibliothèque Mazarine, 3618A (Folio) (p. 2) (*Rés.*).

62. Renouard, p. 117. Copies consulted: British Library, 533.i.3 (1); Harold B. Lee Library, Brigham Young University (catalogue in progress).

63. Renouard, pp. 180-81. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

64. Renouard, pp. 196-98. Copy consulted: Newberry Library, Ayer 111.A5.1532.

65. Renouard, pp. 195-96. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

66. Renouard, p. 204. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

67. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

68. Renouard, pp. 378-79. Copies consulted: Library of Congress, Rosenwald Collection, n. 1023; Harold B. Lee Library, Brigham Young University (catalogue in progress).

69. Charles Estienne. *De Dissectione Partium Corporis Humani*. Renouard, pp. 409-10. Copy consulted: University of Iowa, Martin Collection, xfQM21 E82.

70. Renouard, pp. 412-14. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

71. Renouard, p. 113. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

72. Renouard, pp. 128-29. Copy consulted: Harold B. Lee Library, Brigham Young University, Vault 882.28 C67 1528.

73. Renouard, p. 110. Copies consulted: Bibliothèque Mazarine, 3726, p. 2 (Folio); Newberry Library, Case 6A.41. The title page indicates the date of publication as 1528, yet it is clear from the colophon that the production of the book was not completed until February, 1530, n.s.

74. Renouard pp. 217-18. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

75. Renouard, p. 222. Copies consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress); Newberry Library, Case F.352.116.

76. Renouard, pp. 262-64. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

77. Renouard, p. 267. Copy consulted: Harold B. Lee Library, Brigham Young University (catalogue in progress).

78. *The Printing Press as an Agent of Change,* p. 52 and elsewhere.

79. Konrad Haebler. *The Study of Incunabula.* New York: The Grolier Club, 1933, p. 104.

80. Ibid., pp.105–06.

81. *A View of Early Typography,* p. 108 and elsewhere.

NEW IMAGING TECHNOLOGIES: IS THE PRINT NEWS INDUSTRY ADOPTING A CREDIBILITY PANDORA'S BOX?

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NEW IMAGING TECHNOLOGIES:
IS THE PRINT NEWS INDUSTRY ADOPTING A CREDIBILITY PANDORA'S BOX?

INTRODUCTION

There have been numerous reports about the accelerating pace of technological change in American society — this paper investigates the adoption of new digital imaging technologies in the news industry and the credibility issue that it poses.. The advances that are taking place in computers, photography, videography, publishing, and communications are all tied to improvements made in the past few decades in microprocessor electronics, and they are all of relevance to the news industry. The integration of these silicon devices into the tools of the five fields is encouraging the evolution of a new generation of tools that cross traditional divisions of industry. Although it is being developed and adopted for the same basic function that the photojournalist's standard camera provide, the new still video camera and the other new technologies discussed offer more than an improvement in efficiency. Still video and digital imaging provides new opportunities that have in the past been not even been considered as viable options within the news industry. Some of the new options, such as digital manipulation of news images, have the potential to create ethical and credibility dilemmas for the news media, even if the ethical norms of the news industry may mitigate the effects. Further, the adoption of these technologies is taking place at a rate that may outstrip the news industry's ability to evaluate completely and objectively all of the ramifications that such adoption may sponsor.

It will be shown both in published opinions and in the results of the survey undertaken by this study that there is little doubt that the technologies of still video, digital imaging and transmission devices will be adopted by the industry. The conversion is well underway, and the newest of the technologies are being tested by the media as soon as they become available by the manufacturers. They will be purchased because they are very useful to the print media in helping them provide their product to a society that is becoming accustomed to instant gratification and information.

It will also be shown that more and more photographers, art directors, and photoeditors will be using the new generation of microcomputers that have digital image manipulation capabilities, and it is the opinion of those closest to news photography that these machines and their retouching software will be used for retouching. The ethical concerns of retouching news photos is a topic that is not well addressed at present, and a vast majority of those surveyed believe that it should be addressed more thoroughly.

LITERATURE SEARCH

An investigation into existing literature addressing the ethics of photojournalism was conducted at the libraries of the University of Texas and at Southwest Texas State University. Articles were found within traditional photojournalism texts and general journalism texts at both universities, and it was found that there do exist guidelines that should provide guidance to photographers considering using the new technologies. Concepts of truthful representations or avoidance of distortions or bias in reporting events were presented in most of the relevant literature by authors and editors alike.[1] Written codes of ethics were compiled from numerous photographic and journalism organizations and evaluated during the preparation of this study. But as Clifford Christians, and Pritchard and Morgan have suggested, the value of codes of ethics for controlling individual behavior of journalists may be less important than the impact of peer norms within the journalistic community.[1] And those norms seem to be shifting as the news industry relies more heavily upon freelancers in an industry wide cost cutting trend.

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[1] Merrill, John C. and Ralph D. Barney, (eds.) *Ethics and the Press* (New York: Hastings House, 1975), pp. 10, 11, 27, 28, 48; Emery, Michael C. and Ted Curtis Smythe, (eds.) *Reading in Mass Communication: Concepts and Issues in the*

Much material within the academic journals regarding ethics in journalism addressed theoretical approaches, but written literature specifically addressing photographers with regard to altering photographs used in the news media were non-existent. This is to be expected at this early stage of the development and adoption of the new technologies, as research into how the technologies will be used is just beginning to occur.

One master's study by Craig Hartley from the University of Texas investigated ethical dilemmas of press photographers.[2] The study surveyed members of the National Press Photographers Association and a cross-section of the Austin, Texas, community to discover

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Mass Media, 2nd edition (Dubuque: Wm. C. Brown Company Publishers, 1972), pp. 119; Gans, Herbert, *Deciding What's News*, (New York: Vintage Books, April 1980), p. 304,305; Rothstein, Arthur, *Photojournalism*, Revised edition (Garden City, New York: American Photographic Book Publishing Co, Inc., 1979), p. 204-205.

[1] Christians, Clifford G. "Fifty Years of Scholarship in Media Ethics," *Journal of Communication*, Autumn 1977, pp. 29; Pritchard, David and Madelyn Peroni Morgan, "Impact of Ethics Codes on Judgements by Journalists: A Natural Experiment," *Journalism Quarterly*, Winter 1989, p.941.

[2] Hartley, Craig Hilliard, "The Reactions of Photojournalists and the Public to Hypothetical Ethical Dilemmas Confronting Press Photographers," unpublished Master's thesis, The University of Texas at Austin, December 1981, pp. 1-3, 153.

how the respondents would react to hypothetical ethical questions. His survey found significant differences between the responses of the two groups, and he suggested additions to ethical codes that more directly address the problems of photojournalists.[1] The significance of this with regard to digital imaging is that more news gathering and information dissemination is being done by non-traditional journalists in the form of freelancers and desktop publishers. However, it is not the point of this paper to rehash the discussion on whether or not the theoretical principles of ethics were at risk or wouldn't be followed by responsible photojournalists, even with the new technologies. Nor is it this author's intent to make ethical judgements on whether the examples found of uses or abuses that will be presented are ethically improper from a traditional journalistic standpoint — that matter is an issue that can be addressed by the industry or other researchers, as more examples come to light. The issue that seemed to be of most salience as the literature search turned up examples of how individuals and organizations have used the new digital imaging technologies is one not of ethics but one of credibility and potential damage to credibility of images both in the news industry and outside of it. Will the axiom that "photographs don't lie" become as archaic and dated a concept as the previous generation's slang, as the application of this new technology becomes more widespread?

As a result of the newness of the technologies and the lack of material dealing with credibility of photographs, which until now had never really been much in question, it was decided to concentrate the literature search on current periodicals that were looking at the technologies to try to compile as much information from recent conferences where the topic might be discussed by researchers and members of the journalistic community. So beginning in earnest in 1987, subscriptions were taken out to a wide range of photographic, computer-oriented, video, and publishing (both industrial and desktop) periodicals in order to keep abreast of the most recent trends in the industries. Quarterly visits were made to university libraries to check on whether other articles in periodicals that were not being compiled were appearing in the *Guide to Periodical Literature. Journalism Quarterly*'s annotated bibliography section was also regularly checked under the technology, ethics, and mass communications divisions for other articles that might appear in more scholarly journals. Few appeared. A majority of the sources quoted or referenced in this study came from these more recent articles in industrial and professional photography periodicals. Recent convention papers also were found to be a most useful primary reference source. When questions came up that needed clarification that was unavailable in published articles or papers, experts and specialists were interviewed over the telephone.

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[1] *Ibid.*, p. v.

HOW THIS STUDY ADDS TO THE LITERATURE

The primary problem of earlier studies that made it necessary for this study was that the changes that were occurring rapidly in the five field divisions identified earlier had not been looked at by any researcher or popular press writer in the context of how the technologies were merging into new forms that might affect photojournalism. The articles and studies found were numerous but all had narrow focal points dealing with one technology or advancement or investigation of a single application. This investigator failed to find a single paper that looked at digital imaging from a broad perspective looking at all of the technologies that were contributing to the developments. In presenting talks on the trends to academic colleagues and to students it became clear that even for those with a high degree of interest in computers or other high technologies, the technologies were in such a rapid state of change and advancement that awareness of the broader view of how the advances were merging and making new possibilities was low. Although the topic of digital imaging implications is beginning to attract other academics, Kurt Foss and Staci Kramer among others, different approaches to the research, and personal perspectives and experiences with the technologies, plus the potential importance of the subject to the journalism industry make all contributing research at this early stage of the developments of value.

IMPLICATIONS & EXAMPLES OF DIGITAL IMAGING

One part of this study was to track how the news media and photographers are adopting these new technologies. Substantial support was found throughout the literature search showing examples of news organizations that have already adopted in whole or in part the new news gathering and production technologies for either day to day use or testing. U.S.A. *Today*,[1] *Life*[2] and *Time* magazine,[3] the Associated Press,[4] U.S. *News and World Report*,[5] the *Chicago Tribune*,[6] and other news organizations[7] are among the rapidly growing list that are already integrating the new digital technologies into their routines. Due to the news industry's overriding need to get information out quickly, this is not surprising and it is expected that this trend will continue. Further support for this assumption is provided by the analysis of the survey undertaken, parts of which are summarized a little further on. What the implications of this trend are for the industry is one topic that this research summary will touch upon. It presents the written opinions of a few of the many in and allied to the industry who have been watching the developments take place. This summary will also present a few examples of how the technology has already been used. This section will conclude with a summary of the predicted implications suggested by the opinions that suggested a focus of the survey undertaken and presented in the next section.

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[1] Foss, Kurt, "Still-Video Photography: Tomorrow's Electronic Cameras In the Hands of Today's Photojournalists," Convention paper presented to Visual Communication Division, AEJMC annual meeting, August 1989, p. 8.

[2] "When Seeing Isn't Believing," *Life*, 11:special anniversary issue, Fall 1988, p. 160.

[3] Hart, Joy, "Computing on the Campaign Trail," *Photo District News, Midwestern Edition*, June 1987, p. 44.

[4] Roman, Susan, "PDNews: Electronic Darkroom Becomes AP Standard," *Photo District News, Midwestern Edition*, March 1990, pp. 18-19.

[5] Tatiner, Peter, "National Digital Delivers," *Photo District News*, July 1987, p. 1.

[6] Hall, Tom, "The Leafax 35: A Carry-On Picture Machine," *Photo District News: Midwestern Edition*, November 1988, pp. 22, 26.

The adoption of digital photography raises important ethical questions. With the ability to create digital images comes the ability to manipulate the digital information easily, completely, and transparently. Digital information, unlike traditional photography, can be radically modified with no loss of resolution. More importantly, once an image is digitized, or if an image begins as digital data as is becoming possible, it is virtually impossible to tell whether or not that image has been altered. If the original data file representing a photographic image is replaced by saving an altered version of it under the same file name the original data can be permanently and irretrievably lost.

The ability to manipulate images in photography has existed since photography itself, but it has never been fast or especially easy, and to do it well took skills beyond the

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[7] Binkley, Chris and Audrey Vasilopoulas, "An Electronic Picture Desk: Newspaper Publishing Techniques Progress with the Use of Electronic Imaging Technology," *Computer Graphics World*, July 1990, p. 94; Meyer, Philip, *Ethical Journalism, A Guide for Students, Practitioners, and Consumers*, (New York: Longman Inc., 1987), p. 226.

ability of most photographers. The traditional retoucher's days are numbered in even the advertising segment of the communication field, his most active patron, however, due to the more powerful capability of computerized retouching and scanning equipment. The use of this equipment is becoming so frequent and common in advertising that it is hard to find a photograph in a print ad that has *not* been manipulated or retouched.[1] But why should photojournalists and straight news organizations be concerned with the new technologies moreso than in the past? Photojournalists usually do not have the luxury of time or money that makes photo manipulation a viable tool, and they consider themselves bound, like other types of news professionals, by journalistic codes of conduct and the norms of the journalistic tradition.[2] Part of the issue lies in the fact that ethical standards in the area of news photography are vague and subject to personal interpretation.

The American Society of Newspapers Editors' code of ethics, for example, has nothing specific to say about photography but addresses the question of "truth and accuracy" generally. The code states: "Good faith with the reader is the foundation of good journalism. Every effort must be made to assure that the news content is accurate, free from bias and in context, and that all sides are presented fairly."[3] Many working press photographers belong to the National Press Photographers Association, and as members are required to subscribe and agree to their own more specific code of ethics. The most directly applicable code states, "It is the individual responsibility of every photojournalist at all times to strive for pictures that report truthfully, honestly, and objectively."[1]

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[1] Lapin, Mark, "Fanciful Fabrications," *Photo District News, Midwestern Edition*, October 1987, pp. 1, 32.

[2] Pritchard, *op. cit.*, pp. 935, 941.

[3] Rubin, Bernard, (ed.), *Questioning Media Ethics* (New York: Praeger Publishers, 1978), p. 57.

Some media organizations, like *Life* magazine have in-house guidelines that are considerably more specific.[2] Tom Bentkowski, *Life* magazine's director of design, said recently, "A photograph that represents an actual situation can never be manipulated in good conscience."[3] He speaks from personal experience for in 1984, while working for *Time* magazine, he erased a walkie-talkie antenna that appeared to stick out of the chin of fallen Olympian runner Mary Decker. Of the retouching, Bentkowski later said he "has qualms about it."[4] Another even more specific code can be found in a section of the *St. Louis Post Dispatch*'s new policy specifically regarding digital imaging: "One of the functions of the Scitex system is to enhance the technical quality of photographs to be published in the *Post-Dispatch*. To assure the integrity of our visual reportage, the system may not be used to distort or change the image in a way that misleads the reader, be it for news or feature display."[5] The code was not in effect[6] when

> "An electronically altered photograph by [*sic*; should be 'of'] a Pulitzer Prize-winning photographer appeared on the front page of the March 31 issue of the *St. Louis Post-Dispatch*. The photograph was altered with the

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[1] Hartley, *op. cit.*, p. 163.

[2] Hicks, Wilson, *Words and Pictures, An Introduction to Photojournalism* (New York: Harper & Brothers, 1952), p. 42.

[3] "When Seeing Isn't Believing," *Life magazine Special Anniversary Issue*, Fall 1988, p. 160.

[4] "When Seeing Isn't Believing," *op cit.*

[5] Kramer, Stacy, "The Case of the Missing Coke Can: Electronically Altered Photo Creates a Stir," *Editor & Publisher*, April 29, 1989, p. 19.

[6] *Ibid.*

use of a Scitex electronic imaging system...by Robert C. Holt III, director of photo-technology."[1]

The original photo had in the lower left hand corner a can of Diet Coke® which was electronically airbrushed out for reproduction on the cover. Holt claims to remember photographer J.B. Forbes, the assistant director of photography saying, "Let's Scitex out the Coke can."[2] Holt, in retrospect, admits to the realization that use of the Scitex to remove the can should have been limited to its ability to crop rather than to electronically airbrush the can out of the image. Holt "is especially chagrined because of his reputation as a proponent of Scitex and an opponent of altering images."[3]

Journalism textbooks offer some vague guidance on photo manipulation. A popular editing text offers the following instructions regarding cropping: "Eliminate distracting elements. The editor should crop in essential points of the message the photo is trying to communicate and crop out distracting elements such as door knobs, poles, areas of dark space, foreground floors, or even print flaws such as visible scratches on negatives."[4]

While these guidelines help, there is still much confusion about what is acceptable image manipulation in the news industry. The new digital imaging technology brings this confusion to a head. The crux of the issue is where to draw that vague line between legitimate editing (including cropping and retouching) and improper editing that results in falsifying the record. Sometimes the distinction is hard to make. The National Press

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[1] Kramer, *op. cit.*, p. 18.

[2] "When Seeing Isn't Believing," *op cit.*

[3] *Ibid.*

[4] Stonecipher, Harry W., Nicedward C. Nicholls and Douglas A. Anderson, *Electronic Age News Editing* (New York: Harper & Brothers, 1952), p. 42.

Photographers Code recognizes that "No Code of Ethics can prejudge every situation, thus common sense and good judgement are required in applying ethical principles."[1]

For the most part, photojournalists have an excellent record in this regard. But with all of the existing codes and the pressures of complying with professional norms, there are still numerous examples demonstrating borderline cases that may cause headaches for the industry — in some dramatic cases even by those who admit they should have known better, as demonstrated by the St. *Louis Post-Dispatch* example cited above.

Consider the following:

•In February 1982, *National Geographic* magazine digitally shifted one of the great pyramids at Giza in a cover photograph.[2] (The cover referenced was vol. 161, no. 2, February 1982.) Robert Madden, director of layout and production, explained that the original photo as cropped to fit the cover would have left the crest of the rightmost pyramid out of the picture. To clarify to the reader that the strong diagonal line running off the page was another pyramid, the pyramid was shifted to include its peak. In the editor's words, it was done to "change the photographer's perspective." The manipulation was not explained to readers in the pages of the *Geographic* but was admitted and explained to the press after a staff photographer mentioned it during a seminar in 1983.[3]

•For his ambitious photojournalistic retrospective, Collins Publishers' Project Director Rick Smolan moved a tree on the cover of *A Day in the Life of America*. Smolan said that "the cover is like an advertising [*sic*] for the contents and thus can be altered, but the inside pictures are sacrosanct."[1] Smolan, continues to use digital editing for the covers of his *Day in the Life* series of photo-documentary books. He changed the angle of a surfboard in the arms of a surfer for the cover of his *Day in the Life of California* book. He tried to justify his actions by repeating his claim that covers are sales tools, and a strong vertical image was necessary to attract browsers. He went on to say, "When a new tool comes along there's a temptation to play with it endlessly until finally you figure out how it fits into what you were doing before. At some point, I think the audience deserves to know if the image was something caught on the fly or created for effect." [2]

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[1] Hartley, *loc. cit.*

[2] *Ibid.*

[3] Madden, Robert, director of layout and production, *National Geographic*, personal communication, March 13, 1989.

Compounding the problem of deciding just what are acceptable photojournalistic practices is the news industry's trend toward increasing reliance upon freelancers and stock photo suppliers. As one writer put it, "Money constraints at magazines have made staff photographers about as rare as white rhinos, and freelancers, brokered through photo agencies, are expected to fill the breach."[3]

Although the use of freelancers and stock houses may solve economic problems, it may also create ethical ones due to the editor's loss of control. On July 19, 1987, the Sunday *New York Times* ran a photograph depicting crime in Miami. In actuality, the photo had been a staged corporate shot for the Westinghouse Corporation taken years earlier. Not only was the photograph not of an actual news event, but Olivia Auboyneau, the photographer who claimed to have taken it, had photographed it from another photographer's print and passed the work off as her own. The original photographer, Bob Bender, had died in 1985. The photographic essay was supplied to the *Times* by the New York Office of Sipa Press, an international news photo agency.[1]

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[1] "When Seeing Isn't Believing," *loc. cit.*

[2] Lapin, Mark, "Dangers and Delights of the Digital Domain: Digital Photography & Editing Conference/Silicon Valley, *Photo District News, Midwestern Edition,* May 1989, p. 24.

[3] Gioia, Joe, "New York Times Runs Ad As News," Photo District News, Midwestern Edition, September 1987, pp. 1, 22.

This points out one problem facing the media that may have implications with regard to the new technologies; the more persons involved in the process between the original photographer and the pressroom, the higher the likelihood that misrepresentation or error can occur.

Another problem is multiple-hat photographers. Many freelancers, by necessity, wear many hats, doing advertising work one day and illustrating a news magazine article the next. Fulvio Roiter works primarily as a photojournalist, but he also sells his work through a stock agency. Roiter took an engaging news photograph of three young girls dressed in nuns' habits at the Venice Carnival. He also placed the picture with a photo supply agency. The photo then appeared in a series of print advertisements for Ballygowan Sparkling Spring Water. One of the trio now appeared to be holding a bottle of Ballygowan, deftly inserted at the production stage.[2]

Because they use the same basic process — photography — to get both news and non-news pictures, and because they may even use the same photograph for both news and non-news purposes, and because they may work simultaneously for news and non-news organizations with different standards of acceptance, multiple-hat photographers may be especially susceptible to ethical lapses. Freelance photographers, lacking a close working relationship with editors or bonds of loyalty to their publications, may not be as motivated as are staff photographers to abide by journalistic ethical codes. They may not even be strongly aware of the accepted norms specific to the news industry, or they may not care. Some may choose to short-circuit ethical principles for financial gain. Apparently, the drive to succeed can override good judgement even in a principled journalist as in the case of the author of the article that won, and then lost the Pulitzer Prize for a falsified feature story in the *Washington Post.*[1]

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[1] *Ibid.*, p. 1.

[2] Hall, Tom, "Sparkling Nuns or Not," *Photo District News, Midwestern Edition*, July 1988, p. 1.

That magazines and newspapers are relying more heavily upon freelancers is one trend that impacts on this issue. Another may provide a clue to further relevance in discussing digital imaging. More and more photographers are buying computers for their studios and homes, and with dropping prices, new higher powered imaging programs, and new ways of transmitting images digitally, there is a likelihood that digital images will arrive at news organizations already modified. A recently published survey undertaken by Boston University Professor Donald Kanter and Philip Mirvis found that forty-three percent of Americans — and over fifty percent of those under the age of twenty-four believe that "selfishness and fakery are at the core of human nature." Large majorities believe most people "lie if they can gain by it" and have no qualms in sacrificing ethical standards when money concerns are at stake.[2] Lil Junas wrote in an introduction to an unpublished survey conducted for the National Press Photographers Association in 1975

> Most evident is that the photographers are not all of the same or even similar philosophy, belief or practice concerning ethical and

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[1] Goodwin, H. Eugene, *Groping for Ethics in Journalism*, (Ames, Iowa: Iowa University Press, 1983), p. 160.

[2] Radin, Charles A., "Spirit of America Losing to Era of Jaded Pessimism," reprinted from the *Boston Globe*, in *Austin American-Statesman*, July 8, 1990, pp. D7.

professional standards in their jobs. Whereas twenty would not shoot a potentially dishonest situation, another twenty would.[1]

This cultural attitude was supported somewhat in the survvey undertaken in this study and this combination of trends should make editors consider carefully from where they accept digital images.

Part of the potential problem lies in the nature of some of the tools being developed. Programs that are purchased primarily for darkroom manipulations come fully equipped with tools for more radical image editing and other manipulations. "There is an ever increasing fuzziness between paint and image-retouching software, with the latest products making it all the more difficult for the user to match product with specific need."[2]

Although some believe that news organizations are staffed with principled professionals, examples shown above from both within organizations and as the result of reliance on external photo providers demonstrate that questionable practices do occur. Nonetheless, "Sean Callihan, founder and former editor of American Photographer, asserted that newsroom ethics will prevent abuse. 'Editors are the people who make the decisions,' he said, 'and if editors are behind it, I'm not concerned.'"[3] Others are concerned because editors have biases that do influence their choices and decisions. "The unwritten rule is that conclusions or opinions which are deemed to be ideological can survive if they are supported by evidence."[1]

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[1] Hartley, *op. cit.*, p. 149.

[2] Kaprow, Alyce, "Update on Retouching: Part One of a Two-Part Series on the Current State of Electronic Retouching," *Magazine Design and Production*, March 1990, p. 67.

[3] Lapin, Mark, "Dangers and Delights of the Digital Domain: Digital Photography & Editing Conference/Silicon Valley," *Photo District News, Midwestern Edition*, May 1989, p. 24.

> If, as an editor, what you wanted was real exploratory journalism, in which you're discovering things you don't already know, then the computer isn't as much a threat because it can't reveal those things. But if you're already using photos to depict only what you *want* to depict, then why not use the computer to touch them up, or even to manufacture them. [2]

Fred Ritchen, former *New York Times* Picture Editor, goes on to say,

> The threat [of the use of computers] to photography, ... is not in the technology but in the basic attitude that equates photojournalism with illustration. You start out using the computer to make formal, cosmetic changes, like color correction or extending a blue sky to drop in cover type. OK, you can argue that you haven't changed the intent of the picture. But it's more problematic when you start making changes to convey an editorial point of view. For example, you could say, "let's make Reagan look older. After all, there must be times when he looks quite old, so why not do it with the computer?"[3]

Even so, most editors do make serious decisions to provide as much objectivity as is humanly possible, but editors do not work in a vacuum. Editors cannot know all of the decisions that are made by their staffs at the production level, and furthermore must be responsible to the organizational power brokers who are under competitive pressures. Howard Finberg, art director at the *Arizona Republic*, believes there will be tremendous pressure to digitally improve photos in newspapers. "Newspapers have a declining share of market; the pressure will be on editors to use any technique that sells."[1]

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[1] Gans, Herbert, ***Deciding What's News,*** (New York: Vintage Books, April 1980), p. 194, 195.

[2] Stern, Marilyn, "Fred Ritchen and the State of Photojournalism," ***Photo District News,*** December 1988, p. 68.

[3] ***Ibid.***

> Like editors, photographers do not work in a vacuum either, and with the adoption of the new tools their roles may shift. Some worry that they may end up being taken out of the editing loop entirely. A master's thesis by David M. Lewis at Ohio University in 1983, titled "Electronic Cameras and Photojournalism: Impact and Implications," found a similar omen for still-photographers. Lewis predicted that the electronic transmission of images had the potential "to completely remove the photographer from the editing and selection process...the person receiving them [the images] and operating the electronic darkroom becomes very important... There is a chance that the person who operates the electronic darkroom could become more important in the picture process than the photographer."[2]

One writer even predicts a potentially more dramatic shift in the role of the photographer. Without a solid grasp of photojournalistic ethics, it is possible that a future visual news gatherer could function as a mere assembler of digital data. "A new breed of photographer could emerge, one who goes out and collects images like a reporter collects facts and then comes back and assembles them like a writer writes stories. A series of crude snapshots could thus be turned into photographic masterpieces."[3]

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[1] Lapin, Mark, "Dangers and Delights of the Digital Domain: Digital Photography & Editing Conference/Silicon Valley," ***Photo District News, Midwestern Edition***, May 1989, p. 24.

[2] Foss, *op. cit.*, p. 10. referencing Lewis, David M. ***Electronic Cameras and Photojournalism: Impact and Implications***, unpublished master's thesis, Ohio University, Athens, November 1983.

[3] *Ibid.*, p. 13. referencing Hall, Tom, "Image Studio: Digital Retouching on a Mac," Photo District News, Midwestern Edition, October 1988, p. 78.

POSITIVE DIGITAL ENHANCEMENTS

The new technologies will be used by the media; many are already using them. And there are lots of excellent and justifiable reasons for it. Even when manipulations are done, they need not be heinous or unethical at all. There are legitimate uses of the new editing technology for pure news purposes, as was demonstrated by students at the University of Missouri's Electronic Imaging Lab. An Associated Press wirephoto of a Romanian soldier arrived with a washed out poster in the background. The students electronically enhanced the image and brought back the details of the poster that otherwise would have been lost to the readers of the *Columbian Missourian*.[1] Another example by the *Missourian* staff showed President Bush and Mikhial Gorbachev standing together on the White House lawn. Unfortunately, the image transmitted via AP's Leafax transmitter to the IBM-AT computer at the offices of the *Missourian* also suffered from a washed out appearance. The foreheads of both leaders disappeared completely into the white sky in the background, and the image was soft and fuzzy. Digital contrast enhancement, brightening, and sharpening was done on the image by the student staffers using a Mac II and Adobe Photoshop, and the details of the original photo were restored.[2]

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[1] Binkley, Chris and Audrey Vasilopoulas, "An Electronic Picture Desk: Newspaper Publishing Techniques Progress with the Use of Electronic Imaging Technology," *Computer Graphics World*, July 1990, p. 94.

[2] Before and after photos were supplied to the author by Kurt Foss at ***Columbian Missourian***, June 1990, Photos were scanned into a Mac II with a Microtek 300Z scanner at 240 DPI for halftoning, through Quark Express and a Linotronic 300 at 120 line screens. No photo enhancement was done on the photos supplied.

THE PUBLIC CREDIBILITY ISSUE

One of the most frightening potential implications, even if unethical manipulations never occur from this day forward in the newspapers and news magazines, is the potential loss of credibility of the photographic image. The public is already aware to some degree that photos are manipulated in advertising and observe the photographic magic in film and on the television. Some are becoming aware of instances in magazines as well.

> "The public is watching. *Time* was forced to run an apology last spring [1987] for running a digitized composite photo (with no hint that it was manipulated except for the two credit lines) of a Marine and the U.S. Embassy in Moscow to lead its story on security lapses there."[1]

"The ability of nontraditional news and information providers (with access to these new digital retouching tools) to enter the news and information arenas creates new and uncertain scenarios." When banks, multinational computer manufacturers, phone companies, and national retailers branch out into news and information services, will they adopt the established standards of newsgathering — fairness, balance, objectivity, and a high regard for truth?[2]

> Simon Tuckett, head of a Toronto Design Firm...says he regularly does use Image Studio for "retouching" photos in newsletters he produces for clients. In "retouching," he says, he goes so far as to take unwanted elements

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[1] Cohen, Daniel, "Photo '87: The Computerized Future," ***Photo District News, Midwestern Edition***, January 1988, p. 56.

[2] Aumente, Jerome, "Demassification of the Mass Media and the Impact of the New Media Technologies on the Process," convention Mini-Plenary Session presentation, Association for Education in Journalism and Mass Communications National Convention, Washington, D.C., August 12, 1989, p. 14.

completely out of pictures — which others might call manipulating: although its never been defined.[1]

If the public becomes aware of regular occurrences of altered photos on a widespread basis photographic credibility may be in jeopardy, regardless of who manipulates them. Jay Mather, a staff photographer for the *Sacramento Bee* brings up a critical point: "How can we make sure that readers know the difference between an honest, unaltered photograph and a totally computer-generated concept image?"[2] "This ability to doctor images electronically threatens to undermine the cornerstone of news photography: its credibility."[3] This threat to credibility appeared over and over in articles and conference discussions. Photo critic and author A.D. Coleman warned at the ASMP's 1987 Digital Processing Seminar on November 20, 1987, that because of the ease of manipulation the new technology offers, "the credibility of photographs as a witnessing device will invariably deteriorate."[4] While such radical departures from the norm seem unthinkable in a modern photojournalistic context, the fact that they are now possible casts a degree of doubt and suspicion over the "truth" of all images.

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[1] Hall, Tom, "Image Studio: Digital Retouching on a Mac," *Photo District News, Midwestern Edition*, October 1988, p. 76.

[2] Lapin, Mark, "Dangers and Delights of the Digital Domain: Digital Photography & Editing Conference/Silicon Valley, *Photo District News, Midwestern Edition* May 1989, p. 24.

[3] Foss, Kurt, *Ibid.* pp. 11-12.

[4] Cohen, *loc. cit.*

THE SURVEY

METHOD

To determine whether there was justifiable concern for the possible loss of credibility that has been proposed by various writers and researchers, a survey of persons in the news industry was undertaken. A twenty-five question survey was developed for photographers and photoeditors. Two survey forms were prepared, one for photographers (news staff and freelance) and photoeditors, the second for editorial level personnel, broken down by photoeditor, managing or assistant managing news editor, and art or photodirector, and "other" to include the few publishers or educators who may be members of the organizations to which the survey would be sent. The survey for photographers had three additional questions relevant only to working photographers than the one prepared for management level personnel. Most questions required responses on either a Likert scale with either four or five response options. A four-step scale was chosen to force respondents into a positive or negative response to the questions regarding intent or likelihood of some action. The fifth level was only used on questions of intent of adoption of one of the technologies, and it provided a response for those who have already adopted the tools. The remainder of the questions required either yes or no responses.

Three organizations were chosen to reach a broad spectrum of professionals in the news industry, based upon the main type of memberships each organization represented. The three organizations chosen were the Society of Newspaper Design, the National Press Photographers Association, and the Society of Magazine Photographers.

A stratified sample from the Society of Newspaper Designwas prepared by going through the membership directory and marking those members whose job titles were either photo director, managing or news editor, or assistant managing or news editor working alternately from the beginning and end of the membership roster. Additional names were selected from the center of the roster after every couple of cycles to not exclude members from the center of the alphabet. Names were excluded if the member's organization was not in the continental U.S. or if the newspaper or magazine were not mainstream news organizations. Names were then entered into a computer database, a random sort was executed, and the first 334 names that appeared were printed out for mailing labels.

Mailing lists were purchased from the other two organizations. The National Press Photographers Association sent a random selection of 1,000 of its members on mailing labels. Every third member was selected from the labels sent for a total of 333 from this list. The membership is made up primarily of news staff photographers for newspapers although some members are photo directors, some work for magazines, and there are educators among its membership as well. The mailing labels did not identify position or title in all cases.

The third organizational list that was used was from the American Society of Magazine Photographers. The members are primarily freelance photographers serving the magazine industry. Although a more random selection of members in this group would have been advantageous, a random sort could not be accomplished by the national organization without the purchase of the full 10,000 name membership list because the master list is presorted into separate lists by zip code. A mailing list of about 700 names was purchased from the Austin/San Antonio chapter, eighty of which were district officers from across the country. Preference was made to include those eighty names first; second priority in selecting the remaining members was given to those members with zip codes out of the two primary cities. to get the broadest geographic sample possible. Of the remaining 509, every other label was pulled until 333 total labels had been affixed to an envelope. It is not expected that the local skew of this one list should significantly affect the results of the survey because the majority of members of the ASMP serve the national magazine market regardless of where they reside.

One thousand surveys were then mailed out with self-addressed business reply envelopes included with a cover letter: 334 to management personnel at news magazines and newspapers, and 666 to an approximate 50/50 split of freelance photographers and staff photographers (exact percentage cannot be determined due to incomplete or missing job titles on purchased labels). Upon receipt of returned survey instruments, data were coded and entered into a statistical package (Statview 512+) for analysis. Unanswered questions were coded with a value out of range for removal from statistical computations. Multiple responses to a single statement were similarly coded to avoid possibility of misinterpretation. Statistics were calculated to four decimal places but for final presentation were rounded to one decimal point, except for significance which was rounded to three decimal places and percentage of error which was rounded to two.

RESPONSE

The highest number of responses came from freelance photographers, most likely members of the American Society of Magazine Photographers, although the NPPA membership list may contain some of those. One hundred and fifty-two respondents were photographers, 109 of which identified themselves as freelancers, 2.5 times as many responses than from news staff photographers, although both groups were sent equal numbers of surveys. Forty-eight photoeditors responded, representing 18.0 percent of total responses. Eighteen undeliverable surveys were returned. Two-hundred and seventy partially or totally completed surveys were returned within the final deadline date, four of which were not completed on the back page. Those four were removed from the coding, providing 266 usable surveys or a response rate of 27.1 percent. This response rate is slightly lower than hoped for, possibly due to the June mailing and summer vacations of potential respondents. For random United States population samples three hundred responses provide acceptable percentages of error (in the neighborhood of plus or minus five percent), so with the narrow focus of this investigation, the low return for this stratified, targeted survey can still provide significant insight into attitudes within the news industry. However, a quick analysis of the four measures designed to measure awareness of the technologies revealed a significant overall high awareness among the respondents (3.7 averaged means of the four measures vs. a 3.0 neutral mean). This could indicate either that the respondents participated in the survey because of interest in the subject or that all news industry personnel have a high awareness of the technologies. Without knowing which is the case, the safest assumption would be that the responses may be skewed over the industry attitudes overall due to a higher level of interest in the subject than those who chose not to respond. Further, the low reponse rate of editors (N = 36) and photo directors (N = 23) within the returned surveys should be taken into consideration when projecting their attitudes upon the larger population within the industry as a whole.

Table 1, below, presents the response rates and numbers broken out by job category.

TABLE 1

JOB CLASSIFICATIONS OF RESPONDENTS TO SURVEY (N =266)

Job Classification	N	Percent
photoeditors	48	18.0
news staff photographers	43	16.2
freelance photographers	109	41.0
news or managing editors	36	13.5
art and photography directors	23	8.6
other	7	2.6

RESULTS

WILL ABUSES CREATE CREDIBILITY PROBLEMS?

The hypothesis that abuses of the new technologies will create credibility problems was strongly supported by the respondents when taken as a whole with a mean of 4.6 on a scale of 0 - 6 where 0 represented strong disagreement and 6 represented strong agreement with the statement "Potential abuses of digital imaging technologies will create credibility problems for the news industry." A full 84.9 percent of the respondents agreed with that premise. Only 3.0 percent strongly disagreed. An analysis of variance (ANOVA) series of tests were used to measure the significance of the results (eliminating coded values for both X and Y that fell out of the measured range which indicated a nonresponse) because job classifications were not ordinal data and there were varying Ns on each job category. The ANOVA calculation produced a F-test value of 2.9 which indicates a fairly strong significance at the 95 percent confidence level (p=.013).

Was there consistency of opinion or disagreement between the different job classification groups for this issue. The count (N) of each job classification and statistics are presented in Table 2. The ANOVA analysis indicated that there were measurable significant differences in attitude at the 95 percent confidence level between responses of photoeditors and news editors.

News editors were not as strongly in agreement that the technologies would pose credibility problems as were photoeditors. The significance is observable using the Fisher Protected Least Significant Difference (PLSD) test, the most liberal of the tests performed by the ANOVA analysis. The Scheffe F-test showed no observable significance, which indicates that the significance indicated by the results of the Fisher test is not strong.

TABLE 2

EXPECTATION OF CREDIBILITY PROBLEMS BY JOB (ONE FACTOR ANOVA)

Job	N	Mean	Std. Dev.	Std. Error
photoeditors	48	5.0	1.4	.2
news photographers	43	4.9	1.4	.2
freelancers	106	4.7	1.5	.1
news editors	36	4.1	1.7	.3
art directors	22	3.8	1.9	.4
other	7	4.3	.8	.3

The strongest variance was found between photoeditors and art directors, who were the most likely to feel that credibility was not as much at risk, which can be seen by comparing the means of the two groups. It should be noted that even the art directors, who had the lowest mean of all the groups tested, were still more inclined to say that there is a significant risk of danger to credibility with a mean of 3. 818 than that the technologies posed no risk (3.0 represents a neutral mean on the scale of 0-6 in the coding scheme used). News photographers were more strongly in agreement with the statement than either news editors or art directors, and some statistical significance was found. There were measurable significant differences between freelancers and both editors and art directors as well.

WILL THE TECHNOLOGIES BE USED & BY WHOM TO ALTER IMAGES

Next it was decided to see if there was support for the second hypothesis — whether the technologies will be adopted and used to manipulate images. Although the literature search indicated that news organizations are already adopting the technologies, a major component of the implicational questions is whether photographers themselves will adopt and use the technologies. If that is the case then the credibility implications will come to a head that much more quickly. There were five statements designed to measure adoption of these technologies: (1) in my work I have access to or own a microcomputer with digital imaging capabilities (yes or no), (2) in the next five years, I expect to purchase or upgrade to a microcomputer with digital imaging capabilities (yes or no), (3) in the next five years, I expect to purchase or requisition a still video or digital camera system for my work (yes or no), (4) do you or your organization intend to adopt the use of still video cameras and digital transmission devices within the next five-to-ten years (Likert scale where one = no plans increasing in likelihood to five = already in use), (5) do you or your organization intend to adopt the use of computer-based digital imaging systems for image halftoning, enhancement, cropping, or retouching within the next five-to-ten years (Likert scale where one = no plans increasing in likelihood to five = already in use).

Responses to the first statement regarding current access to a computer produced indications that currently photoeditors, photographers, and freelancers were not using computers with equivilent means of 1.1. A mean of greater than 1.5 would be necessary to indicate that a majority in each of the groups was currently using computers with the coding scheme used. This is not surprising as the technologies are relatively new and the possibilities to use the machines for photography purposes are very recent. Because it was assumed that currently photographers would not be using the technologies in large numbers yet, a one-tailed t-test was run to determine whether the responses could be statistically insignificant. The test indicated significance of the results with a paired t-value of 20.5 and a probability of less than .001. One-hundred and seventeen gave negative responses to that statement, which comprised 89.3 percent of responses received (N=130, this question was only on the photographers survey form). Thirteen of the respondents already had computers with digital imaging capabilities (10.7 percent). Although the figures would seem to indicate that both types of photographers and photoeditors were about equally likely to currently be using computers these figures cannot be trusted, as an ANOVA test of significance measured between the groups resulted in a F-test value of only .6 with a p=.6.

It was expected that photographers and photoeditors as a group would be investing in the equipment, so the second statement measuring intent to purchase or upgrade to a microcomputer with imaging capabilities was looked at. Again a one-tailed t-test was run, which yielded a paired-t of 16.5 with a probability value of .0001 (N=132). Eighty of those who responded to the question (60.2 percent) answered no to the statement and fifty-three (39.9 percent) responded positively. This indicates that a strong percentage intend to be using digital imaging computers within five years, resulting in an installed user base of photography professionals in the news industry nearing fifty percent when current users are taken into account. The analysis of variance showed that freelancers were more likely to indicate a positive response to the question with a mean of 1.4 than were news photographers with a mean of 1.3. Photoeditors had the lowest means of the group at 1.1. Significance was measurable between the responses of photoeditors and freelancers at the ninety-five percentile range as measured in the ANOVA Fisher test with a value of .3. No other measurable differences were indicated as significant within the group measured, excluding those who were coded as "other" as the result of written comments (educators & photo suppliers).

Why freelance photographers might be more likely to invest in the equipment can be hypothesized but not supported with the results presented here. The fact that these machines can be used for multiple purposes — imaging, bookkeeping, and for keeping track of images in files, at stock photo agencies and magazines — is bound to appeal to freelancers. Some freelancers may intend to use the imaging abilities for expanding into special effect photography or to better serve their advertising accounts where manipulated images are more acceptable. To imply that they will purchase these machines for purposeful unethical manipulations is pure conjecture and is not implied or supportable by this study.

WILL STILL VIDEO BE ADOPTED?

In general, yes. Responses to the question "Do you or your organization intend to adopt the use of still video cameras and digital transmission devices within the next five to ten years?" generated an overall 2.9 mean where 2.5 represented a neutral "under study or trial" response and higher scores represented a high likelihood of adoption or current use (N=258, standard error = .1). One hundred and three responded negatively representing 39.9 percent of responses. Forty-nine (18.992 percent) responded that it was under study or trial, which can indicate curiosity only so, it would be safest to assume that it represents a non-committal position. There were ninety respondents representing 34.9 percent that took the very likely position (the statistical mode), and sixteen said that the systems were already in use (6.2 percent). These results indicate that although all are not intending to adopt the technologies at this early stage of the development of the technologies, there will be a large number of organizations and photographers using the tools in a very short period of time.

More interesting are the results of the analysis of variance between the responses. The F-test provided a value of 7.1 (p<.001) indicating significant variance between some of the groups (N-257). Editors, art directors, and photoeditors had higher than neutral means at 3.3, 3.4, and 3.3 respectively, whereas news photographers were just slightly higher than the neutral position at 2.5, and freelancers had the lowest means at 2.5. The differences in the responses between managerial positions and photographers in every case showed up as being of statistical significance, indicating a difference in opinion across the board between the two organizational levels. The significance is observable at the ninety-five percent level in the Fisher test and in all but two cases, as well, in the more conservative Scheffe F-test (Table 6). Could this difference of opinion between managerial level news persons and photographers indicate a reluctance on the part of the shooters to retire their trusty Nikons, Leicas, and high resolution films as pressure is applied by upper management to use the new electronic devices, or is this difference more likely to be because editors and other higher level personnel are more in tune with the organizational objectives that will drive the movement to the adoption of the new tools? Photographers with whom this issue has been informally discussed do indicate that resolution of the images they produce is a major issue with them, and they are reluctant to sacrifice the image quality of their work to a tool that cannot yet compare with traditional photographic methods. From a management perspective, the resolution of some of the finer grain films may be a luxury that is simply unnecessary for the accomplishment of the job — especially when the printing process is going to reduce the resolution to the relatively crude eighty-five line-per-inch halftones used in most newspapers.

WILL THE INDUSTRY ADOPT DIGITAL IMAGING SYSTEMS?

Survey results support the contention that the industry is moving ahead with the adoption of the new digital imaging tools. The mean of the survey responses to the question "Do you or your organization intend to adopt the use of any computer-based digital imaging systems for image halftoning, enhancement, cropping, or retouching within the next five to ten years?" was a 3.2 indicating a slightly higher than neutral mean (N=269). As in the prior question, a noncommittal "under study or trial" response was placed in the center of the Likert scale corresponding to a 3.0 value on the five-point scale. The significance measuring .006 with a one-group t-test is not strong but does fall within a range that indicates validity in this interpretation.

This small variance between a truly neutral position and the overall mean of the groups measured is strengthened, however, with a mode of four, representing a response of "very likely." As can be seen on the frequency distribution of responses presented in Table 3, more than fifty-four percent of responses indicate that there is a strong likelihood the technologies will be in place before the end of the decade. Thirteen percent indicated that their organization was already using them.

TABLE 3

RESPONDENTS' INTENT TO ADOPT DIGITAL IMAGING SYSTEMS WITHIN DECADE

(N=270)

Responses	N	Percent
no plans	47	17.4
not likely	34	12.6
under study or trial	42	15.6
very likely	**111**	**41.1**
in use	36	13.3

Once again an ANOVA series was performed to see whether there were measurable differences between the way the different job categories responded to the question, and again the F-test indicated there were some (6.0 where $p<.001$, $N=258$). After having seen the results of the analysis of variance for the still video adoption question, it came as no surprise to see mirrored results on this question. Photographers were less likely to respond with a higher intent value than the management level personnel surveyed. The differences between that categorical breakdown showed significance by the Fisher test in all cases and was further supported by the Scheffe F-test in two of those at the ninety-five percent confidence level.

OTHER FINDINGS OF RELEVANCE TO THE CREDIBILITY ISSUE

Other questions posed on the survey were looked at relevant to the credibility issue discussed earlier. Brief summaries of the responses to those questions are presented on the next few pages.

The first statement looked at was "The easy manipulation of photographic images through computer technology will *encourage* some in the news industry to alter photographs used in newspapers or magazines." The italics were not in the survey but the choice of the word "encourage" was designed to investigate whether news professionals believed that the capabilities of the technology itself would motivate some to alter photos. The theoretical question posed in-between the lines is "does technology impose changes beyond efficiency?"

The mean of the 258 valid responses to this question was 3.1 which indicates more responses in agreement with the statement than against it. A neutral mean would be represented by 2.5 as there were four response choices coded from one-to-four. When a one sample t-test was run to test significance the test indicated that the results were not likely to have been caused by chance as the t-value was a 9.4 and the probability (two-tailed) was less than .001.

More than seventy-seven percent of respondents agreed with the statement as written, and more than half of those strongly agreed with the premise that the technology will encourage the altering of news photos. The degree of alteration may well be a moot point if, or more likely when, readers become aware that alteration is occurring. In some of the cases cited earlier, such as the pyramid and the Coke® can incident, it matters not whether the revision is beyond ethical norms or of minor consequence to the main subject of the photo, credibility of news images are still at risk. And if the new tools do in fact encourage alteration there will be some that will give in to the temptation, unless history does not, in fact, repeat itself.

When photographers and editors were posed the statement, "If or when we adopt new digital imaging technologies, our organization will allow minor manipulation of news photos," most responded negatively. However, over one-fourth believed that it was possible under some conditions, and 8.8 percent believed it was likely (N=262). By comparison, when they were asked to respond the the statement, "If or when we adopt new digital imaging technologies, our organization will allow minor manipulation of photo illustrations for feature stories," 47.5 percent believed it possible under certain conditions, and 24.3 percent considered it likely (N=263). Only 28.1 percent thought it was not likely or that it would never be done by their organization. Although studies are yet to be done to measure readers' awareness of the differences between the two types of photography, it seems likely that the line is a grey one to many readers, if they have thoughts about it at all. If it may be assumed that some readers are not aware that there are differences in what is appropriate in the production of a photo on a feature article compared to one that appears on page one, then can it not be just as dangerous to photographic credibility to alter or manipulate feature photos as hard news photos?

A short summary of some of the responses to other questions posed that provide additional insights that digital photo manipulation will be taking place are presented below. Similar one-group t-tests were run as a check on significance, but for the sake of brevity all details and complete distributions will not be presented in this report, as the conclusions that can be drawn from them are incidental to the primary hypotheses.

To the statement, "I would use a high resolution digital imaging system on my photography only for traditional darkroom enhancements such as contrast control, minor spotting, and cropping," respondents overall were more likely to agree than disagree with a sample mean of 3.2 (t-value 11.6, p<.001; a one-tailed test was used because the direction of the response was anticipated). One hundred and twenty-eight respondents (48.7 percent) strongly agreed with the statement, seventy-eight others (29.7 percent) somewhat agreed, thirty-five somewhat disagreed (13.3 percent), and twenty-two or 8.4 percent strongly disagreed. This indicates that over twenty percent of those photographers and related news professionals indicated an aptitude for using the technologies for more radical manipulations.

Again a factorial ANOVA series was applied to determine if there were differences and if so where they were. The F-test resulted in a strong 9.0 value with a p=.0001 so there were differences. Freelancers had the lowest means (2.8) indicating the highest likelihood of disagreement with using the tools for only traditional manipulations whereas art/photodirectors and photoeditors had the highest means of the group indicating strongest agreement with the statement (3.7 and 3.6 respectively). The variance between the means of freelancers and both photoeditors and directors would most likely then be expected to show significance if any significance could be measured which, in fact, turned out to be the case in both the Fisher test and the Scheffe F-test calculations. There were also significant differences observable by both tests between the responses of freelancers and news photographers, which also comes as no surprise. This should serve to warn the news industry that once it is easy and feasible for freelancers to supply digitized images directly to the media via disks or through the transmission systems, there is a strong likelihood that some of those images will have been manipulated beyond standard news norms. It is not an issue today, but by the year 2,000 it should be.

When posed with the statement, "Photoeditors or art directors at news organizations will use a digital imaging system in the near future to alter, correct, or otherwise modify photographs submitted for publication," the highest percentage of respondents (46.6) somewhat agreed (N=262). Just a fraction under twenty-five percent (sixty-five respondents) strongly agreed with the premise, and only thirty-four were in strong disagreement with it (mean=2.8, t-value=5.7, with a one-tailed p<.001, range=3, minimum=1, maximum=4, standard deviation =948, standard error=.06). These results come as no surprise, although the high percentage of those in agreement with the statement is more than anticipated. It was decided to run the analysis of variance tests on this question to see whether there were significant differences between the groups in the responses to this statement. Although the significance levels were not high at the ninty-five percent level (F-test=2.5 with a p=.045) there were measurable significant differences at that percentile level between the responses of freelancers and those of both photoeditors and staff photographers (Fisher test .3 for both). Freelancers did show the highest group means at 3.0 where 2.5 would represent a mean where there were as many equally weighted negative responses as positive ones. Photoeditors, news photographers, and news editors all showed the lowest means, all clumped between 2.6 and 2.7. The most plausible explanation for this difference could be the freelancers' more distant relationship with the news industry than internal personnel, and their responses to the question might be reflecting a slightly less understanding position of the internal norms, but this explanation is speculation at best.

THE ISSUE OF DISCLOSURE

Finally, the statement to determine whether "Photographers should always inform photoeditors or other photo buyers of the nature of any and all digital image manipulations that have been done on a photographic image," was looked at. A one group t-test was run comparing the responses recieved from the sample with responses expected from a normal distribution with a population mean of 2.5. The calculated t-value of 26.7 (p=.0001) established a level of trust in the statistical variance from a normal curve. The sample mean in response to the statement was very high at 3.6, indicating strong agreement with the statement from respondents when taken as a whole (standard deviation=.7, standard error=.04, N=264). One hundred and ninety–five (73.9 percent) strongly agreed with the statement. Fifty somewhat agreed (18.9 percent). Only 7.2 percent disagreed. The two groups most likely to have disagreed, according to an ANOVA frequency distribution of means table, came from freelancers (relatively low mean of 3.5), and the category called "other" (lowest mean of 3.2) made up of seven individuals in education, digital equipment sales, photolabs, and other photo service companies. The Fisher test did show significance between the responses of photoeditors and freelancers (.2 at the ninety-five percent confidence level), but it did not show up between the category "other" and any of the other groups. This may well be attributable to the low *n* of the "other" category with only seven respondents making statistical validity difficult to establish with confidence with the tests used.

SUMMARY AND CONCLUSIONS

In general, it seems clear that the digital imaging and still video technologies will be adopted (and rapidly so) by the news industry and photographers and there is a credibility question that is posed by that adoption. How profound that credibility issue is to the print news industry and the consumers of that news is an unknown that can only be answered by time and possibly the way the industry addresses or fails to address the issue before the public comes to call into question the integrity of the photographic image. As a postscript to the study the following thoughts are put forth as suggestions to minimize the impact of the new technologies for consideration.

HOW CAN THE NEWS INDUSTRY PROTECT ITS INVESTMENT IN PHOTO CREDIBILITY?

Media credibility, like faith itself, can be damaged more easily than it can be rebuilt. "Taking the step of writing, and in some cases publishing, a code of ethics forces the newspaper into a public commitment of a certain policy that will be much more difficult to alter in a moment of convenience."[1] Despite researchers' inability to prove that a written code of ethics positively enforces behavior the public perception benefits of a written code may go far in protecting their credibility.[2]

To these ends it is recommended that professional photographers and organizations adopt a framework for informing editors of the nature of any digital photo manipulations with each submission. When a digitized image is faxed or otherwise transmitted to a news network by a freelance or other photographer not under regular employment by the news outlet (be it a newspaper, broadcast channel, or wire service) a disclaimer should be sent to inform editors of any and all digital manipulations that have been applied to the image. A model of such a disclaimer might read as follows:

> "This photograph has not been modified in any way that is incompatible with standard photojournalistic practice as suggested by the Association of Newspaper Editors and Publishers' Code of Ethics. Manipulation of the image has only been applied in regard to enhancing its reproduction quality for news purposes. Such manipulation includes and is limited to ☐digital sharpening, ☐overall contrast enhancement, ☐overall contrast reduction. Any manipulations beyond the scope of the above are

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[1] Evatt, Dixie Lee Shipp, "Emerging Codes of Ethics and Contemporary Ethical Standards in Texas Daily Newspapers," M.A. thesis, University of Texas at Austin, 1976, pp. 119-20.

[2] Pritchard, *op. cit.*, p.941.

> outlined in detail in the paragraph that follows: (at this point detailed description of all other manipulations or alterations of the image as taken should be explained)."[1]

Another recommendation is that professional photographic society memberships, such as the Professional Photographers of America, the National Press Photographers Association, and the American Society of Magazine Photographers, should address these issues in their own codes of ethics, especially in the journalistic divisions. "It is one of the responsibilities of the photojournalist to be sure that the editor receives accurate information, and to be immediately informed as to any inaccuracies in order to minimize damage to credibility."[2]

A recommendation that the use of a disclaimer be adopted by members of such organizations and be included in their own codes of ethics is suggested to help minimize resistance to the use of digitized images coming from photographers who are members. "Images should not be faked or staged *unless clearly stated as such* [author's italics]. ...Images should reflect reality in the truest and most objective fashion possible" was presented as an addition to existing codes of ethics for press photographers by Craig Hartley in his master's thesis.[3] Photographers and their organizations must accept the responsibility of policing themselves for the benefit of their members and profession.

Editors might consider making it a practice to use only digital images from freelancers that are accompanied by such a disclaimer or from accredited members of organizations that have adopted a code of ethics that is compatible with standard journalistic practice. It is also recommended that editors and news organizations adopt the policy of always printing notification in the photo caption of any use of digital manipulations so the public comes to trust that they will be informed in all instances.

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[1] Terry, Danal and Dominic L. Lasorsa, "Ethical Implications of Digital Imaging in Journalism," convention paper presented to Media and Society Division, AEJMC annual meeting, August 1989, p. 14.

[2] Hartley, *op. cit.*, p. 153.

[3] *Ibid.*

The majority of those surveyed believe that the ethics questions should be addressed by the media through written ethical guidelines. They have also indicated that when images are retouched or altered that the news media and other photo buyers like the photo agencies that serve it should be informed of the changes.

The credibility issue is of paramount importance to the news industry. Most of those in the industry surveyed recognize the threat to credibility that the new technologies pose. This threat to photo credibility goes beyond the mainstream news media and may not be altogether protectable. Newsletter designers, the broadcast media, portrait photographers, corporate public relations practitioners, and even political organizations will all have increasing access to the new technologies that make possible the creation of new photographic realities.

OTHER ISSUES AND QUESTIONS THESE FINDINGS POSE

The new technology may encourage deliberate misinformation tactics used by political entities. Governments and other political powers around the world have used photo manipulation to achieve their own ends in the name of national security, internal peace, and to protect their positions of power. The Russians have made common practice of doctoring photographic images when it suited their needs. In a picture published in 1961 by the leadership of the Soviet Union there appears three Soviets prominent in the early space race:

Yuri Gagarin, Sergei Korolev, and Kiril Moskalenko. In obstensibly the same photograph published twenty years later, Moskalenko was airbrushed completely out of the picture.[1]

In a major turn of events, the Chinese also have admitted to embellishing their "public images." The Chinese recently exhibited a series of photographic forgeries by former party propagandists. One memorable picture portrayed a young woman offering her breast to feed a soldier wounded in the 1979 war with Vietnam. The Chinese now admit the picture had been faked, with the woman's image superimposed on that of the soldier.[2]

If the news industry is willing, on occasion, to manipulate images it is probably safe to assume that under certain circumstances political groups will take advantage of the new technology as well to achieve their goals. With all of the different possible types of organizations and individuals that may be willing to alter photographs at will, will it be possible to trust any of the new photography? Will digital photography be permissible in a court of law as evidence? Digital images that can be retouched or changed with absolutely no evidence of modification are unlike traditional photographic prints that can be compared to the original negatives from which they are made. Negatives that have been retouched can be identified as such easily by a trained eye, and with special techniques such as ultraviolet imaging. Bits of electronic data once erased or replaced with new bits cannot.

There are other legal implications that the new technology will raise. The Copyright Act of 1976 was supposed to give photographers all rights to their work unless otherwise specified in writing. But the question of who owns the rights to images manipulated and composited from images taken by others has not been satisfactorily resolved by the courts.

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[1] "Bye-Bye, Boris, a Crash Course in Russian Photo Fakery," *Life*, December 1986, p. 67.

[2] "Bejing Double Take," *U.S. News and World Report*, March 28, 1988, p. 11.

Recent litigation involved a photograph by Bill Allard appearing in one of his books published by the New York Graphic Society in cooperation with Little, Brown and Company. A freelancer hired by *Esquire* magazine blew up a copy of Allard's photograph for use as a background in a photographic editorial illustration. The photographer admitted to it, and said he did this frequently in creating his own "collages." He said he did not believe it was necessary to credit the different pieces used in his work. *Esquire*, however, settled the case with Allard before it reached the courts.[1]

Photographer Robert LaRouch wrote that photojournalism has never been immune from the problem of ethics but technology does increase the potential for abuse and "the possibilities are chillingly endless."[2] Although the implications of the possibilities of the new technologies are frightening, what is more alarming is the amount of agreement by those in the news industry that the technologies *will* be used for manipulations, no matter how minor, as the credibility of photography as a medium capable of powerful truth appears about to be sacrificed to progress.

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[1] Allen, Casey, "Go West," Studio Photography, July 1988, pp. 42, 44.

[2] Kramer, *op. cit.*, p. 19.

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USES OF COMMUNICATION TECHNOLOGIES IN AMERICA'S COURTROOMS

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Uses of Communication Technologies in America's Courtrooms

I. INTRODUCTION

In 1859, technology arrived in America's courtrooms when the U.S. Supreme Court admitted daguerreotypes as evidence in a case. Daguerreotypes were photographs made by an early method on plates of chemically treated metal or glass. In 1887, a U.S. court allowed a telephone conversation to be used as evidence for the first time. Later, courts began to admit recorded sounds made by phonographs and Dictaphones, and the Ohio Court of Appeals allowed the first motion picture film evidence in 1916 (Berman 1988, 143,144). One of the first documented uses of videotape in a courtroom occurred in December 1971 when a deposition in a personal injury case was taken from a doctor in Oak Ridge, Tennessee, and used in a trial in St. Petersburg, Florida (Salven 1975, 222).

As these examples demonstrate, U.S. judicial systems have allowed a variety of communication technologies to be used in courtrooms for more than one hundred years. The rapid advances in communication technologies in the past twenty years, however, have greatly increased the possibilities for their use. But, despite scattered experiments with technologies in courtrooms, no extensive adoption of them has occurred.

Some favoring the innovations say that failure to use them will result in a continuing drain on the time and energy of lawyers, more pressure on overcrowded court systems, and rising costs for all involved in the judicial process (Salvan 1975, 222). Overall, in court systems that have experimented with communication equipment, most judges, attorneys, defendants, and plaintiffs have voiced positive comments.

Others involved in the judicial process, however, express caution about the use of technologies because of the lack of information about their impacts. Some court officials fear the innovations will deprive defendants of constitutional guarantees, such as the right to confront their accusers. Other concerns include technology's effects on the traditional operations of the judicial system and on the role each person plays in the system.

While lawyers and judges have debated the legal implications of communication technologies, social scientists have conducted surveys and interviews, and performed experiments, to determine the impact of the innovations on the judicial process.

The challenge facing both court officials and social scientists is determining the proper uses of communication technologies. This involves finding ways to streamline the judicial process at the same time the rights of those charged with crimes are preserved. A balance must be found between adopting innovations and preserving the legal structure.

Will the legal concerns expressed, or the technological advances made, determine the future of communication technologies in American courtrooms? So far, the legal concerns seem to have had a more dominant influence over decisions about using technology, because of the reluctance by many to change courtroom practices. Changes in a judicial system based on centuries of tradition do not come easily. Computers have changed the way court records are filed and processed in many parts of the United States, but acceptance of computerized records does not necessarily lead to acceptance of other communication technologies.

An article published fifteen years ago acknowledged the trend toward greater use of technology in the nation's court systems, but cautioned that not all the changes resulting from technology would be beneficial. While technology may increase the efficiency and speed with which courts handle cases, Jethro K. Lieberman warned that a judge's abilities shouldn't be measured solely on a "case-per-hour ratio" (1976, 88). In other words, there is more to providing justice than just disposing of cases quickly.

In the opening chapter of a book reporting the results of experiments with videotaped trials, Gerald R. Miller and Norman E. Fontes wrote that they suspected most people would prefer the conservative attitude of court officials toward new technology over an attitude of "change for change's sake" (1979,13). Americans put their trust in a judicial system that they believe will settle their legal disputes and punish criminals. People both inside and outside the court system hesitate to make major changes in a mainstay of American society.

Miller and Fontes also wrote that the legal system's adoption of communication innovations would depend on "a number of complex social, economic, and political considerations" (1979, 14).

In a 1988 book on researching the new media, Frederick Williams, Ronald E. Rice, and Everett M. Rogers outlined the types of considerations that influence the adoption of an innovation, which is defined as "an idea, practice, or object perceived as new by an individual or other unit of adoption." They listed five attributes of innovations that determine the rate of adoption: relative advantage, compatibility, complexity, trialability, and observability (1988, 71).

All of these factors may influence how rapidly communication technologies become used in U.S. courtrooms. For example, court officials may not utilize innovations because they do not see any advantage in changing judicial procedures or because they do not think the innovations are compatible with the dignity that should prevail in courtrooms. Also, adoption may be slowed by difficulties in using some of the technologies and by the lack of opportunities to observe others using them.

The trialability factor -- in this case, the ability to experiment with communication technologies in the courtroom on a temporary basis -- may be the primary factor governing the rates of adoption. Courts cannot simply try such technologies as closed-circuit television and then decide whether to continue using it. Many of the innovations require a large investment of time and money, which courts do not have available for experimentation. Also, many judges and lawyers hesitate to use a technology such as videotape if they do not know what effect it will have on juries' decisions. They will not jeopardize defendants' rights to fair trials by experimenting with technologies that may have uncertain effects.

In another area related to trialability, Lieberman discussed the difficulty in studying technologies in the courtroom because of the wide variety of legal cases (1976, 90). There is no such thing as a typical court case since each one differs with the judges, attorneys, plaintiffs, defendants, and juries involved. For this reason, generalizing the results of studies on courtroom technologies can prove difficult.

Because of the factors just described, the legal concerns have dominated decisions about whether to use communication innovations in U.S. courtrooms, but that may change as technology becomes more widespread in all aspects of American society. By working together, court officials and social scientists can answer some of the questions about the influence of specific technologies on the judicial process. This paper looks at what has been done, and what remains to be done, to attain a better understanding of how technologies should be used.

The paper first looks at recent uses of several technologies. The next section of the paper examines the legal and practical impacts of the communication innovations. It then looks at studies done by social scientists to assess the social and psychological effects of the communication equipment on those involved in the judicial system. The final section analyzes how the legal concerns and empirical findings can be studied together to determine the future uses of technology. Policies also are recommended for using communication technologies in U.S. courtrooms, based on the research done to date.

II. COURTROOM USES OF COMMUNICATION TECHNOLOGY

While technologies such as videocassette recorders and computers have gained wide acceptance for business, educational, and entertainment purposes in the past ten to twenty years, communication technologies have crept much more slowly into America's courtrooms. While no technology has been adopted on a widespread basis throughout the country, some courts have experimented with videotape, closed-circuit television, telephone conferencing, and satellites to conduct judicial proceedings. Each of these technologies is examined individually to see how it has been used.

A. Videotape

Video technology has become common enough in America's court systems that publications have started running articles about how to produce successful videotapes to present in court. An article aptly titled "Putting the Jury in Your Shoes" told lawyers that "letting jurors see and experience what you are telling them goes a long way toward winning your case" (Marcotte, July 1, 1987, 20).

One instance where this philosophy paid off involved a case where a videotape was made from the cockpit of a Lear jet. The plane was put through a difficult series of maneuvers, and the defense attorneys introduced as evidence three synchronized videotapes showing the pilot successfully recovering from each of the maneuvers. This videotape helped to convince jurors that a fatal 1978 Lear jet crash near Vickery, Ohio, was not caused by design defects (Marcotte, July 1, 1987, 20).

Another article in Trial recommended that attorneys initially seek the help of video contractors to produce quality tapes, and it then described how to select production and editing equipment (Misko and Hood 1987, 100). Still another article advised attorneys using videotapes for depositions to avoid taping "an hour or two of a talking head on a video screen answering questions from a disembodied voice" (McElhaney 1988, 86).

Although the prevalence of articles about technology seems to suggest that video has become an accepted part of America's judicial process, that is not the case. The use of video equipment in the courtroom has developed -- and is likely to continue to develop -- slowly. But, change has begun as courts throughout the country have used videotape to preserve the trial record, to present depositions, to present evidence, and to conduct entire trials. Each use of videotape is described briefly.

Preserving the trial record

Perhaps the least objectionable use of videotape consists of recording court proceedings as official records. After Kentucky lawyers complained that court reporters cost too much and were slow in providing transcripts, the state decided to install cameras in several courtrooms to record transactions. Robert Stevens, chief justice of the Kentucky Supreme Court, said the system has worked well, and the courts make copies of tapes available to the news media at cost because the tapes are public documents (Frank 1985, 26).

Not everyone agrees with Stevens, however, about the benefits of using videotapes for permanent records. Jill Wilson, director of research and technology for the National Shorthand Reporters Association, said court officials likely would find taped court records unwieldy, even with fast-forward and fast-rewind capabilities. She suggested that many judges and lawyers would prefer to read written transcripts (Frank 1985, 26).

In another article, Lawrence W. Burt, former president of the same association, noted that courts in Ohio and Tennessee abandoned the use of videotape as the sole record of proceedings because of dissatisfaction with the results. When cases recorded only on videotape were appealed to a higher court, judges expressed frustration with not having written transcripts and with delays in obtaining them after they were requested. Officials had hoped the videotaped records would accelerate the process of appeals, but in some cases, the new system actually slowed the appeals (Burt 1976, 62,63).

Presenting depositions

Among the most common uses of videotape is producing depositions, which present a witness's testimony, made under oath but not in open court, and preserve it for use during a trial.

The use of videotape for depositions began after 1970 amendments to the Federal Rules of Civil Procedure, which authorized the use of non-stenographic recordings of depositions. Since that time, all states have liberalized their procedures for depositions, too. Federal and state rules address such issues as "discretion in permitting or denying videotaped depositions, camera angles, editing, certification by recording technicians, (and) identification at the opening of the videotaped deposition" (Drucker and Hunold 1988, 39,40).

Some courts have more stringent procedural requirements when the parties cannot agree on the use of a videotape deposition in a trial. For example, the U.S. District Court for the Southern District of Alabama makes this requirement when attorneys disagree on the issue: "The deposition of the witness may be recorded on videotape, but the testimony must *also* be recorded by a certified stenographic reporter and transcribed in the usual manner" (Citrin 1988, 92,93).

Presenting evidence

Using videotape to present evidence in a case allows attorneys to show "a method, process, or technique that cannot be replicated in the courtroom." For example, lawyers can use video to show the scene of an accident or the aftermath of an environmental spill. A key to producing a videotape that the judge will allow as evidence involves showing an object, person, or scene as it was at the time in issue in the case, so it does not mislead jurors (Joseph 1986, 61). A similar use for video consists of taped reconstructions and re-enactments, but attorneys must prepare these carefully, or judges won't admit them as evidence (Joseph 1986, 63).

One unusual case involved the use of videotaped testimony to enhance the credibility of a hypnotized witness. When a driver could not recall who caused a head-on collision in which she was injured, trial lawyer Michael Abelson of Washington, D.C., taped a hypnotist helping the woman remember the details of the accident. Under hypnosis, the woman recalled that the other car had swerved into her lane. Some of the attorneys involved in the case objected to the use of the video, but the judge allowed it because he said the tape clearly showed that the woman was under hypnosis and telling the truth. The jury awarded the woman $95,000 (Weiss 1982, 62).

A more common use of videotape in recent years is "day-in-the-life" films, which visually and audibly record the activities of an accident victim throughout a typical day (Preiser and Hoffman 1981, 26). Judges require that the tapes be authentic and relevant to the case. Proper authentication includes providing information about the making of the film, such as the competency of the camera operator, the type of camera used, and lighting arrangements; about the manner and circumstances for developing the film; and about the projection of the film, such as the speed at which the projector was run. A person present when the video was made also must testify that the picture accurately depicts the events taped. To meet judges' relevancy requirements, the videotape must tend to prove or disprove some issue in the case (Preiser and Hoffman 1981, 28).

Some judges have objected to day-in-the-life videos if they seem to overemphasize the plaintiff's pain and suffering from an injury (Preiser and Hoffman 1981, 29). For this reason, experts suggest that those preparing these videos exclude "close-up shots of agonizing grimaces or tears" and sound tracks with "painful groans and screams" (Berman 1988, 150).

Still another use of videotape to present evidence occurs in child-abuse cases in which interviews with young victims are taped for possible use in a trial. For example, Minneapolis police reported that in 1983, they used videotape to record interviews with alleged victims of child abuse in seventy-five cases, and sixty defendants pleaded guilty as soon as they saw the interviews. If the defendants didn't plead guilty, attorneys used the tapes as evidence in court ("Videotaping: Device for Fighting Child Abuse" 1984, 36).

A major concern expressed about this use of videotape in the courtroom involves depriving defendants of the opportunity to confront their accusers face-to-face before a jury ("The Testimony of Child Victims in Sex Abuse Prosecutions: Two Legislative Innovations" 1985, 808). Some states that allow videotapes of alleged child abuse victims also permit the defendants to be present when the taping occurs and provide for cross-examination by the defendants' attorneys. Statutes in Texas and Kentucky authorize cross-examination and allow defendants to see and hear the testimony of the children, but ensure that the children cannot see or hear defendants ("The Testimony of Child Victims in Sex Abuse Prosecutions: Two Legislative Innovations" 1985, 814,815).

C. Michael Clark, who supports videotape statutes governing child abuse cases, emphasized that judges should exercise caution in allowing videotaped testimony. He recommended that courts consult experts to help determine whether the conventional judicial proceedings would have a damaging effect on the child. Courts also should consider the relationship of the accused to the victim and the nature of the offense: Cases of indecent exposure should be handled differently from cases of aggravated sexual assault (Clark 1986, 1240,1241).

Conducting entire trials

The most controversial use of videotape in the courtroom involves prerecording entire trials and showing the tapes to jurors at a later time. The first trial recorded in this fashion occurred in November 1971 under Ohio Judge James L. McCrystal, who has become a strong supporter of this use of technology (McCrystal 1978, 251). In most cases, the impaneling of the jury, the closing arguments, and the judge's instructions to the jury are conducted in the conventional manner. Testimony for videotaped trials can be recorded almost anywhere, but often it is taped in a studio or at the scene of the incident that is the basis for the lawsuit. Often, only the witness and attorneys for both sides attend the actual taping, while the judge does not attend. The judge edits the testimony and makes decisions about objections raised by the attorneys. Objections sustained by the judge may be completely edited from the tape shown to the jury, or just the sound may be removed. Some courts allow attorneys to attend sessions where the judge edits the taped testimony. Often, the judge does not appear in court during the time the jury actually watches the videotaped trial (McCrystal 1978, 251-253).

Proponents of prerecorded videotaped trials say they eliminate prejudice and errors because improper remarks can be deleted from the tape presented to the jury. Videotaped trials also can save time for jurors. For example, the use of videotape reduced the first trial recorded by McCrystal from an estimated five days to a tape of two hours and forty minutes (Lieberman 1976, 89).

In one article, McCrystal described a period in November 1973 when fourteen jury trials were started and completed in eleven trial days, plus two days for selecting jurors and presenting opening statements and closing arguments. Fifty-two hours of uninterrupted testimony was shown to the juries, and the average trial lasted two and one-half hours. McCrystal presided over all fourteen trials and estimated they would have taken a minimum of thirty trial days using traditional courtroom procedures (McCrystal 1974, 448).

Some opponents of videotaped trials, however, argue that the disadvantages outweigh the advantages. Even though the jury may spend less time watching the trial, others must spend more time taping the testimony and editing it. Other problems may relate to the reactions of participants and jurors to the tape. The precise impact on the type of testimony presented and on jurors' verdicts is not definite, despite some social science research in this area (Lieberman 1976, 90).

Marshall J. Hartman questioned whether jurors could separate television as reality, as in videotaped trials, from television as entertainment, as people experience in their homes. "Research has demonstrated that the whole juror comes to court; he brings to the courtroom his entire experience with the media. ... We don't know what unconscious forces might be at work affecting our judgment when we see a criminal trial in the form of a television program or movie" (Hartman 1978, 256,257).

B. Closed-circuit television

Jurisdictions in several states, including Idaho and Florida, have used a second communication technology -- closed-circuit television -- for arraigning defendants at jails, rather than taking them to courtrooms. Many of the courts using these systems cover wide geographic areas and implement the systems to save money (Gilmore 1980, 396).

Ada County, Idaho, which includes the city of Boise, began using closed-circuit television for arraignments in August 1979, after receiving funds from the Law Enforcement Assistance Administration and technical assistance from Boise State University. The system includes cameras and monitors set up in both the county courthouse and the county jail. Before the arraignments begin, a court marshal meets with all the defendants to discuss their need for an attorney and the filing of affidavits to obtain an attorney if they cannot afford one. The marshal informs them about their constitutional rights and tells them they need to sign a waiver if they wish to permit sentencing through the audio-video equipment. The marshal then

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takes all the forms to the courthouse and gives them to the judge conducting the arraignments (Gilmore 1980, 399,400).

During the arraignments, the television equipment allows the judge and defendants to communicate with each other. Provisions also are made for private conversations between defense attorneys and defendants, while the attorneys stay in the courtroom and the defendants at the jail. Officials estimate the video system has resulted in a net savings of approximately $75,000 a year to Ada County (Gilmore 1980, 400).

The system has received a positive response from everyone involved, according to Warren H. Gilmore, district trial court administrator for the Fourth Judicial District in Ada County. "The judges feel they devote more time to each defendant without feeling the sense of urgency and pressure that existed with the old procedures. The prosecutors and defenders have more time to prepare their presentations before arraignments. The defendants are delighted because they are released from custody within minutes of the hearing; they used to sit in the courthouse all day waiting for transportation back to the county jail" (Gilmore 1980, 401).

Courts in Dade County, Florida, have used a similar closed-circuit television system, and W. Clinton Terry III and Ray Surette have investigated the impact of the technology there. The use of the video equipment began in 1982 as a ninety-day experiment for conducting initial misdemeanor court appearances. The experiment proved so successful, that video has become a permanent part of arraignments in Florida's Eleventh Judicial Circuit (Surette and Terry 1984, 305,306).

Through interviews with court participants, Terry and Surette found that judges, prosecutors, and defendants expressed favorable attitudes toward the use of video equipment for misdemeanor arraignments. Public defenders, however, said the video arraignment decreased judges' control of the courtroom and affected the quality and effectiveness of legal representation (Terry and Surette 1985, 17-19). More information about the specifics of their research will be considered in the section dealing with empirical studies.

C. Telephone conferencing

A third communication technology used to reduce the time and cost of traditional court hearings is telephone conferencing. In its simplest form, the hearing consists of a three-way conference call between the judge and attorneys for the opposing sides. Courts have used telephone conferences for setting trial dates, for conducting hearings on motions made by the attorneys, and for conducting pretrial and settlement conferences (Hanson et al.1983, 408).

Courts first used telephone hearings in the Western United States in the early- to mid-1960s to handle minor judicial matters. By the early 1970s, California was using telephone conferencing for full evidentiary hearings, and the practice had even spread to some federal district courts by the early 1980s (DeFoor and Sechen 1984, 597).

Telephone hearings also were introduced in selected Colorado and New Jersey trial courts in the spring of 1981, and four researchers obtained favorable responses from attorneys about the use of this technology. Attorneys' satisfaction, however, depended on their ability to present an effective oral argument, the ability to answer judges' questions, and judges' understanding of the issues. More specific information about their research will appear in the section of the paper on empirical studies (Hanson et al. 1983, 419).

Although courts have used telephone conferencing most extensively in civil cases, some use also has occurred in criminal courts. This has raised concerns about the inclusion of criminal defendants in the telephone hearings. "Unlike civil applications where litigants frequently do not attend pretrial hearings, the criminal defendant has a right to be present at all critical stages of the proceedings" (Hanson et al. 1984, 612). To provide this access, defendants often participate in the hearings by telephone from jail, or in some cases, even from hospitals (Hanson et al. 1984, 614-62

D. Satellites

Satellite teleconferences are a fourth communication innovation used in some legal proceedings. One use initiated in recent years involves conducting depositions by satellite when a witness in a case is separated from the attorneys. In October 1987, Geiger & Loria, a Harrisburg, Pennsylvania, legal reporting company conducted its first satellite deposition in a personal injury case. The doctor giving the deposition went to a communications office in suburban Los Angeles, which had satellite uplink capabilities. Two attorneys at Geiger & Loria's office in Harrisburg conducted the one-and-a-half-hour deposition at a cost of $1,200, which included satellite and technical costs and a videotape of the deposition. While the costs may be prohibitive to some, Frank Daily, a Milwaukee attorney, said satellite depositions may help him and other attorneys with nationwide practices to reduce their travel time (Marcotte, Dec. 1, 1987, 26).

Shawn P. Harbaugh predicted that courts soon would use satellite technology for presenting live courtroom testimony, instead of just for depositions. In 1989, court officials planned to establish a temporary satellite link between Seattle, Washington, and Tucson, Arizona. A 1,300-

mile change of venue in a case required that the ability to testify was not contingent on financial resources. The jury, judge, and attorneys in the case were to be in Tucson and the witnesses in Seattle (Harbaugh 1989, 86).

III. THE LEGAL AND PRACTICAL IMPACTS

Decisions about whether to use communication technologies in America's courtrooms depend, in part, on the legal and practical impacts courts officials believe the technologies will have.

The positive effects of using communication technologies have received some mention already. The potential benefit mentioned most frequently is relieving the current congestion of cases in the nation's court systems. For example, by using video technology, many believe the courts could reduce their backlogs of cases and prepare better schedules. Videotaped trials also provide for more efficient use of time by all involved in the judicial process, many technology proponents argue (Shutkin 1973, 366-370).

Those supporting more use of technology also say that it can improve the judicial proceedings. For example, videotaped trials can eliminate prejudicial statements since jurors do not hear them when they are edited from the tape. Some also argue that, with videotaped trials, judges have more time to make correct decisions about objections raised by the attorneys. In traditional trials, judges' decisions must be made immediately before the trials can proceed. Attorneys also may benefit from videotaped trials since they always know when witnesses will be questioned and can prepare adequately. In addition, timid witnesses may relax more and be less hesitant while providing testimony in a less-formal environment than a courtroom (Shutkin 1973, 371-375).

Despite these positive comments by some who work in the court systems, many lawyers and judges express caution about the implications of using communication technologies. Concerns include the impacts on the judge's role in the courtroom, on the traditional trial process, and on the public's perception of the judicial system. Other concerns involve the rights of defendants to confront their accusers and have a public trial, the right to be present during the trial, and the right to effective counsel. The use of technology also may pose difficulties for journalists wishing to cover court proceedings. Each of these concerns is examined briefly.

A. Impact on judges' role

One concern about prerecorded videotaped trials involves the change in the judge's role in court proceedings. Irving Kosky, former president of the National Shorthand Reporters Association, questioned whether judges should be absent when video trials are taped and when they are shown to juries. "The judge's presence during a trial is essential. Judges play a role that varies from slightly active to very active, depending upon the abilities of the attorneys before them and the responses and actions of the witness. ... To exclude judges from participating actively in trials would be to tamper with the very soul of democracy" (Kosky 1975, 236).

B. Impact on trial process

A second concern about the use of communication innovations in courtrooms is the impact they may have on the entire trial process. For example, Samuel Brakel noted that a trial videotaped in segments, edited, and then presented in a continuous form in court differs greatly from a regular, live trial. He said a witness testifying outside a traditional courtroom might not "have the same psychological compulsions toward testifying accurately and completely as an in-court, live witness" (1975, 957).

While videotaped trials may reduce the time jurors must spend in court, they also decrease the amount of time for jurors to think about and examine the evidence presented, and to interact with other jurors. Brakel wrote that this could have detrimental effects (1975, 957).

Related to the traditional trial process is the issue of who has the right to order or ask for the use of a particular communication technology. For example, should judges have the authority to order videotape depositions? Should either party in the legal dispute have the right to prevent the use of a particular technology if he or she objects to it (Taillefer et al. 1974, 116)?

C. Impact on public's perceptions

A third concern involves the impact of the use of technology on the public's perceptions of the judicial process. Two researchers said the court system not only administers justice, but also serves as a means of "legitimating the overall social system it serves. As such, the courtroom and its players take on a symbolic value; their actions and courtroom decorum contain a 'majesty' and 'mysteriousness' pointing to the sanctity and well-being of the larger society. Loss of these qualities may diminish the aura of authority and legitimacy surrounding the judicial system, the laws of the land, and the social order which they represent" (Terry and Surette 1986, 35).

D. Rights to confront witnesses and to a public trial

A fourth concern, particularly in criminal trials where videotape is used, involves questions about a defendant's Sixth Amendment rights to confront witnesses and to a public trial. According to a 1970 court decision, California v. Greene, the right to confront witnesses is met if the defendant's attorney has adequate opportunity to cross-examine witnesses, even though the jurors are not physically present to see how the witnesses and the defendant act when the questions are posed (Salvan 1975, 226,227). Some have suggested that, to ensure a public trial when all testimony has been prerecorded, the public must be allowed to view the videotape at the same time as the jury (Taillefer et al. 1974, 119).

E. Right to attend trial

Another constitutional concern related to the guarantee of a public trial is the right of the accused to be present during his or her trial. Although the Sixth Amendment does not specifically stipulate this right, it is deeply rooted in American law, and has been considered protected under the Constitution. Because of this, many cautious about videotape trials stress the need to ensure that the accused is present during the taking of testimony (Shutkin 1973, 382,383).

F. Right to effective counsel

A final legal concern about the use of communication technologies in the courtroom involves a defendant's Sixth Amendment right to "have the assistance of counsel for his defense." Often, testimony of one witness in a live trial will suggest questions the defense attorney should ask of other witnesses. Extensive use of videotaped testimony could preclude effective cross-examination of witnesses and present problems with recalling a witness whose testimony has been presented by videotape (Taillefer et al. 1974, 115).

G. Journalists' concerns

Although legal journals often do not discuss how the use of technology relates to the First Amendment right of a free press, journalists have expressed concerns about this issue. The primary discussion has centered on the rights of the media to copy and broadcast tapes prepared during criminal investigations. "The federal courts of appeals that have ruled on the issue agree that there is a presumption of public access to these materials, but they disagree on the strength and source of that presumption and on the circumstances necessary to rebut it" (Jansen 1983, 1455,1456).

Most cases have addressed the issue in the context of the free press-fair trial debate, which pits the public's right to complete news information against a defendant's right to a fair trial by an impartial jury (Jansen 1983, 1456,1457). The courts have assumed the broadcast of taped evidence could threaten jury impartiality in four situations: where the defendant is currently on trial, where retrial of the defendant is a possibility, where the defendant will be subsequently tried on other charges, and where co-defendants or related parties will subsequently be tried on related charges (Jansen 1983, 1464).

Journalists argue that the right of access to criminal trial exhibits -- even if they are audio or video tapes -- coincides with the right of access to criminal trials. Allowing the media to broadcast evidence provides the right of access for the majority of the public who cannot attend a trial in person (Jansen 1983, 1470,1471).

D. Marburger wrote that courts have no valid justification for restricting access to evidentiary tape recordings played in open court, even if the tapes contain material that court officials believe could injure third parties. In cases where the media seek to obtain audio or video recordings, they often know the content of the recordings from court-approved transcripts. "Denying broadcast access to portions of the tapes does not determine *whether* those segments will be reported to the public; but rather the excising of objectionable statements only determines *who* will utter them" -- the newscaster or the person who spoke them (Marburger 1983, 661,662).

IV. EMPIRICAL/SOCIAL SCIENCE RESEARCH

Some empirical/social science research on the use of communication technologies in the courtroom has been done during the past twenty years, although it is not extensive. Some research has involved surveys and interviews at sites where the equipment is in use, and some has featured experiments with simulated juries to try to understand the impact of the technologies. Research on telephone conferencing, closed-circuit television, and videotape is described.

A. Telephone conferencing

In 1980, four researchers undertook the first phase of a study to determine the attitudes of judges and attorneys toward the use of telephone hearings for civil motions. Of the approximately fifty judges who used the technology, most expressed strong support and had near-unanimous agreement on three points: Telephone conferences saved the court time, they had little or no effect on the nature of the hearings, and they helped attorneys by reducing their travel and waiting times (Hanson et al. 1983, 409,410).

The researchers also surveyed attorneys' predispositions toward telephone motion hearings in civil cases. They sent questionnaires to civil lawyers, most of whom had little or no experience with this technology. The responses showed the most support for using telephone hearings in procedural matters, such as setting trial dates, and less support for using them in substantive matters, such as making a motion to dismiss a case (Hanson et al. 1983, 411).

The study also included interviews with attorneys in Colorado and New Jersey who had participated in telephone hearings. Of the 351 attorneys interviewed in Colorado, 52 percent were very satisfied and 32 percent were somewhat satisfied with the hearings. In New Jersey, 51 percent of the 155 attorneys interviewed were very satisfied and 33 percent were somewhat satisfied (Hanson et al. 1983, 415).

The researchers concluded that attorneys consider telephone hearings to be satisfactory substitutes for in-person proceedings, but their degree of satisfaction depends on the ability to present an effective oral argument, the ability to answer the judge's questions, and the judge's understanding of the issues (Hanson et al. 1983, 419).

In another study, the Fair Hearing Project investigated the use of telephone conferencing to conduct unemployment insurance and welfare administrative appeals in New Mexico over a four-year period ending in 1981. In the unemployment insurance area, more than one thousand cases were assigned to the experiment. More than one hundred appeals in the Aid to Families with Dependent Children and Food Stamp programs also were included in the test (Corsi et al. 1984, 647).

Researchers used two modes of analysis in the unemployment insurance experiment: split telephone hearings in which all participants could participate from any locations, and office telephone hearings in which all participants went to a Department of Employment Security area office. An appeals referee then initiated a two-party conference call linking the hearing room in the main Department of Employment Security building with the area office where the participants gathered. A similar office telephone hearing set-up was used with the welfare cases, but no split telephone hearings were used (Corsi et al. 1984, 648,649). In general, the researchers found few statistically significant differences in hearing activity between cases where telephones were used and those conducted in person. They wrote: "Given these results, researchers could find no empirical basis of experimental evidence which would lead to a conclusion that the agencies should resist taking advantage of the savings teleconferencing offered in the areas of cost-savings, time-lapse reductions, and productivity improvements" (Corsi et al. 1984, 654,655).

B. Closed-circuit television

In the mid-1980s, W. Clinton Terry III and Ray Surette studied the use of closed-circuit television for arraignments in Miami, Florida (1984, 1985, 1986). One part of the research involved surveys of jailed misdemeanor suspects who were unable to post cash bonds; one group consisted of defendants whose arraignments included the use of closed-circuit television, and the other group consisted of defendants who had traditional arraignments. Of all the defendants questioned, 332, or 75.1 percent, were happy with their court appearances. Of the video defendants, 198 (67.6 percent) said the court system was fair; of the non-video defendants, thirty-nine (50.6 percent) said the court system was fair. The researchers used discriminant analysis to explore the differences between those who thought the courts were fair and those who didn't. They found that the use of closed-circuit television for arraignments had less impact on individuals' perceptions of fairness than did their ethnic and racial identity, the outcome of their individual cases, and their number of prior court appearances (Surette and Terry 1984, 313-315).

As another part of their research, Terry and Surette surveyed judges, prosecutors, and public defenders, in addition to the defendants, who used the closed-circuit television system in Florida. The four judges surveyed agreed that the system offered improvements over other means of arraignments and reported less general disruption during the video arraignments. Their complaints focused on the technical quality of the video picture. The four prosecuting attorneys viewed the system favorably, but to a lesser degree than the judges. On the negative side, they thought the video system made it difficult for defendants to communicate with the judge, their attorneys, the prosecutors, and their families. The seven public defenders all thought the video arraignments decreased the judge's control of the courtroom, and six thought the system had a negative impact on the quality and effectiveness of legal representation. Of the 352 defendants surveyed, the majority said the video system did not hinder their ability to argue their cases (64.3 percent) or to ask questions (78.4 percent). A total of 78.5 percent of the defendants were happy with their court appearances, and 84.4 percent thought the video made their cases go faster (Terry and Surette 1985, 17-19).

C. Videotape

Some of the most extensive research concerning communication innovations involved several years of experiments at Michigan State University to study the impact of videotape on potential jurors. Numerous articles and a book have been published about this research, headed by Gerald R. Miller and Norman E. Fontes (Miller 1974; Miller, Bender, Florence, and Nicholson 1974; Miller, Fontes, and Dahnke 1978; Boster, Miller, and Fontes, 1978; Kaminski, Fontes, and Miller 1978; Hocking, Miller, and Fontes

1978; Miller and Fontes, May 1979; Miller and Fontes 1979; Miller, Fontes, Boster, and Sunnafrank 1983; Kaminski and Miller 1984).

The Michigan State researchers based their studies on the view of a trial as a communication event. From this perspective, they considered two characteristics of trials particularly important: First, trials "typically occur in face-to-face settings with no mechanical, mediated communication linkages"; and second, both the structure and content of messages exchanged in courtrooms are highly governed by the rules of court proceedings. They then designed experiments to test whether videotape changed the usual communication patterns in courtrooms (Miller and Fontes 1979, 15).

The researchers used simulations of actual trials to maximize realism in the experiments. With a few exceptions, the simulations involved actual jurors who were viewing re-enactments of actual cases in the presence of professional judges. In most instances, the jurors believed they were about to deliberate and deliver a binding decision in the cases. Miller and Fontes said the realistic simulations helped to increase the validity and generalizability of their findings. Another aspect of their research focused on the "effects of the videotape medium on the information-processing and the decision-making cognitions of individual jurors *prior* to group deliberation. This methodology was adopted in order to observe the uncontaminated effects of the presentation per se, which would likely be modified and confounded during deliberation" (Miller, Fontes, and Dahnke 1978, 658).

The studies conducted by the researchers over a four-year period looked at such issues as how jurors responded to various modes of presenting trials, what effects occurred when the videotapes eliminated inadmissible evidence, how much information jurors retained under different modes of trial presentation, and how jurors responded to various editing techniques (Miller, Fontes, and Dahnke 1978, 658).

At the end of the book on their findings, Miller and Fontes wrote this conclusion: "Within the procedural confines of our research, there is no evidence to suggest that the use of videotape exerts any deleterious effects on the juror responses studied; in fact, as far as retention of trial-related information is concerned, it appears that videotape sometimes results in higher retention levels" (Miller and Fontes 1979, 207-208). While drawing this conclusion, they also cautioned that the research dealt only with matters common in civil trials, and that the same results might not be obtained for criminal trials. They also noted that their research used simulated trials, and the experimental results could differ from what would occur in actual trials (Miller and Fontes 1979, 208).

In their book, Miller and Fontes drew nine conclusions from their research. They are:

1. The use of videotape in the courtroom does not significantly affect jurors' verdicts.

2. The use of videotape in the courtroom does not significantly affect the monetary awards to plaintiffs made by jurors.

3. The use of video significantly affects the amount of trial-related information retained by jurors during a trial. They retain more from taped testimony, particularly when it is presented in black-and-white.

4. Juror perceptions of attorney credibility can be significantly influenced by different editing and production techniques that are a part of available technology.

5. Juror perceptions of witness credibility are affected by the use of videotape.

6. Videotape presentations of different types of witnesses (strong and weak) affect juror evaluations of the credibility of the witness.

7. The use of videotape to present witness testimony does not significantly affect jurors' judgments of the accuracy of the testimony presented.

8. The deletion of inadmissible materials from testimony does not appear to exert a strong impact on jurors' perceptions of attorney credibility.

9. Within the context of the simple production techniques used in their studies, the characteristics of witnesses appear to exert more impact on jurors' responses than do production decisions (Miller and Fontes 1979, 211,212).

V. RELATING LEGAL CONCERNS/SOCIAL SCIENCE RESEARCH

Despite the social science research that has been done, the verdict on how extensively communication technologies should be used in America's courtrooms is not in. Neither those expressing legal concerns nor social scientists researching the topic have provided clear-cut answers about which uses of technology are appropriate and which are not. Between the two extremes of those advocating the use of communication technology for all court procedures and those totally opposing it are many who have reserved judgment until they have more information.

The key to finding the proper uses for communication technologies in America's courtrooms lies in continued cooperation between court officials and social science researchers. Most of the research mentioned in this paper resulted from social scientists and court officials working closely with each other. Court systems using new technologies often have allowed researchers to do in-depth studies about the impact of the communication equipment. For example, judges and lawyers in Michigan even participated in the experiments Miller, Fontes, and their associates conducted on the use of videotape trials.

A primary consideration for researchers doing studies in actual court settings is the need to preserve the constitutional rights of those accused of crimes. Court actions have potentially severe consequences for defendants -- they can end up serving time in prison, spending years on probation, or paying fines. Communication technologies, particularly trials conducted entirely by videotape, should not be used indiscriminately until more information is known about the impact of the technologies. And, in trying to assess that impact, social scientists need to maintain a respect for all those involved in the court proceedings.

Court officials and social scientists interested in the legal system's communications processes may, at times, have difficulty working together on common concerns because of differing goals. Jeremy Cohen and Timothy Gleason wrote that the functions of legal theories and communication theories differ. The goal of the law is to settle disputes and to regulate behavior; legal cases always have to be decided in some fashion. The goal of communication researchers, however, is to understand the social and psychological implications of the legal system. They don't need immediate answers as court officials do in specific cases (Cohen and Gleason 1990, 14).

The resulting conflict may be variances in the way court officials and communication researchers look at the use of communication technologies in specific settings. For example, consider a case where a construction company is charged with safety violations after a worker dies in an accident at a construction site. The attorneys representing the family of the worker who died decide they would like to use a videotape recreating the accident to show the jury how the company was at fault. Should the judge allow the videotape to be admitted as evidence? Should the attorneys for the construction company have any say in whether the videotape is admitted and, if it is admitted, in how it is produced?

In this situation, the primary concern of the judge would be whether the admission of the videotape as evidence would aid in providing a fair outcome to the lawsuit. The primary concern for the attorneys would be whether the videotape would help or harm their respective clients. The primary interest of communication researchers, on the other hand, would be whether jurors would respond to the videotape, as a vehicle of communication, differently from how they would respond to evidence presented in a traditional manner. Ultimately, the judge, the attorneys, and the researchers all would be interested in the outcome of the trial, but their focuses would differ greatly.

In deciding how the videotape would affect the case, the judge and the attorneys would seek information about cases where videotape had been used before. That information would be available only if the impact of videotape on the outcome of cases had been assessed by someone -- very likely social scientists -- in the past. In assessing how jurors would respond to the videotape, communication researchers would need permission from court officials to conduct a study. In this situation, the legal officials and the social scientists would depend on each other for accomplishing their specific goals, but they also might distrust each other. The judge and the attorneys might see the social scientists as trying to interfere with providing a fair trial in this specific case, while the social scientists might see the court officials as trying to hinder them from gaining information that could help the judicial system overall.

Both the specific focus of judges and lawyers and the broader focus of communication researchers need to be considered when assessing the impact of communication technology. To accomplish this, court officials and researchers need to overcome their distrust of each other and consider ways to work together toward a better understanding of how to use technology in the courtroom. The following are possible ways to work toward this understanding without sacrificing the legal rights of defendants:

1. Cooperation can begin with researchers contacting judges in areas where communication technology is already in use. In these settings, researchers can assess the impact of communication technology by means similar to those used by Terry and Surette who looked at closed-circuit television arraignments in Miami, Florida. Researchers can survey all involved in the process -- judges, attorneys, other court officials, plaintiffs, defendants, and, where appropriate, jurors -- to determine their impressions of the technology used in the courtroom. In this type of setting, the courts already would have invested time and money in establishing closed-circuit television or another communication system, and officials would likely be more open to researchers wanting to study the impact of that system. The more information that exists about the effects of technology in places where it already is in use, the better researchers can define the questions that remain unanswered.

2. Researchers also need to establish contacts with court officials who would allow them to study cases where attorneys propose to use technology on a more isolated basis than in the instances just cited. This

would include such uses as the introduction of a videotape as evidence or the testimony of an expert witness, who lives in another state, by satellite. When such cases occur, and the judge and attorneys have agreed to use a certain technology, researchers should request permission to study the technology's use in that particular case. These types of cases are likely to deal with complex topics where the court officials believe a videotape, for example, can better be used to present evidence than conventional court testimony. Such studies done over a period of time and in different settings would help establish patterns in the way people respond to communication technologies in the courtroom.

In both of the first two areas of research suggested, the technology would be used with the consent of court officials concerned with protecting defendants' legal rights. These officials could help researchers define ways to conduct their studies without jeopardizing the rights of those accused of crimes.

3. Another possible area of research, in courts where technology already is in use, involves looking at whether the communication technology has saved the court system time and money. This savings often is advanced as a reason for allowing communication technologies in the courtroom, yet few studies have examined this aspect of the topic. Judges advocating the use of videotaped trials, for example, have talked about the amount of time jurors save by watching edited videotaped testimony rather than listening to all the testimony in person. But the trade-off comes in the costs of coordinating people's schedules to do the videotaping, the costs of actually videotaping the testimony of witnesses, and the costs of editing the tapes. All of these things require time and money, too, and the differing costs need to be analyzed.

4. Another area researchers should look at in evaluating the use of technology for specific cases is the impact the technology has on perceptions of the judicial system. Some claim the use of technology will cause people to lose respect for America's legal traditions. One possibility for further study would be to survey jurors in cases in which the entire trial or portions of the testimony were presented by videotape. Researchers could ask whether jurors' impressions of the court system have changed since they served on the jury and, if so, how they have changed. Ideally, researchers would have potential jurors complete a survey about their impressions of the court system both before and after they served on the jury to compare the results. The impressions of jurors in cases using technology could be compared with those of jurors in cases not using technology to assess any differences.

5. In a final area of research, researchers must continue to use experiments to study the impact of communication technology. The artificiality of experiments represents a disadvantage in this type of research, but the advantage lies in being able to manipulate the use of the technology in ways not possible in an actual courtroom. For example, one area considered in the videotape experiments conducted at Michigan State University was how jurors responded to different ways of editing out inadmissible testimony in a videotaped trial. Researchers could not approach this issue in the same way in an actual courtroom.

Many possibilities exist for researchers wanting to conduct experiments on the impact of technology in the courtroom. The Michigan State research, for instance, indicated that videotape did not significantly affect mock jurors' verdicts, but it did indicate that videotape could affect mock jurors' perceptions of attorneys and witnesses. Future research needs to look at whether the use of specific production and editing techniques could influence jurors' perceptions of witnesses and attorneys enough to affect their verdicts.

These specific areas of research would provide a much better understanding of how communication technology affects judicial decisions without jeopardizing the constitutional rights of defendants.

Based on the research done to date, the following policies are appropriate for guiding decisions about when to allow communication technology to be used in the courtroom:

1. Court systems in the United States should make greater use of such communication technologies as teleconferencing and closed-circuit television for arraignments and hearings. Most of the research on these technologies has shown everyone involved in the judicial process, from judges to defendants, to be satisfied with their use. Communication technologies can save time and money when used for these purposes because they don't require judges, attorneys, plaintiffs, and defendants to all be in the same place -- the courtroom -- at the same time.

2. Communication technologies should be used more extensively in civil trials than in criminal trials. Most of the research done to date has examined civil cases, so there is more information about the impact of technology in these cases. Also, the outcome of civil cases usually is less severe than in criminal cases.

John A. Shutkin expressed a similar idea when he said that courts should consider cases on an individual basis. For example, videotaped trials might be appropriate for small-claims negligence actions, often requiring expert witnesses, but they might not be appropriate in complex criminal trials, involving "deeper probing into personality and motivation" (1973, 392).

3. Communication technologies should be used during trials only with the consent of the judge, attorneys for both sides, and all parties involved in the case. The impact of using communication technologies in trial settings is too uncertain at this point to require their use against someone's wishes.

4. The use of videotape for presenting entire trials should be done only on a limited basis until researchers have studied the issue more. Videotaped trials represent a major departure from traditional court procedures and must be undertaken with care.

The combination of continued research and expanded use of communication technologies in U.S. courtrooms can help to define the proper roles technologies should play in the judicial system.

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Commercial Database Use in the Newsroom

by

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Boston, MA

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COMMERCIAL DATABASE USE IN THE NEWSROOM

The widespread adoption of computer technology in the writing and retrieval of news has led to the availability of a variety of databases useful in the reporting process. Questions relating to the role and impact of databases in reporting the news have begun to emerge as news personnel gain greater access to and expertise in database uses. This study's focus is an exploration of how news staffers utilize VU/TEXT, one of the largest online information services currently available, in the reporting and editing functions.

According to Aumente[1], Knight-Ridder's VU/TEXT unit has become the world's largest retrieval service with over 50 full-text newspapers, a variety of news wires, and over 1500 business publications. The service was created originally to store newspaper text electronically. Member newspapers are paid a royalty when their online newspaper texts are accessed by other subscribers. Newspapers may use their own stored texts free of charge except for communications costs. Despite declining profits in some of its units, Knight-Ridder reported a 14% increased revenue last year and a 40% operating profit in its business information units, which include VU/TEXT[2] . Clearly, information retrieval services such as VU/TEXT are displaying strong usage patterns--patterns which are also manifested in the newsroom.

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[1]. Jerome Aumente, New Electronic Pathways, (Newbury Park: Sage Publications, 1988), p. 82.

Initial experiments with news as a component of information retrieval systems prompted predictions of an ever-expanding reportorial role. Anthony Smith[3] pointed out that the advent of computerized news gathering would dramatically alter the reporter's work. According to Smith, the reporter would be able to "collect more original material or perform more thorough research...The more skilled the reporter the more of a researcher he becomes, a human scanner of data bases, an intermediary between the enormous and ever growing store of available knowledge and the reader" (p. 206).

To date a small group of studies and reports is available on actual newsroom use of information databases. In a 1985 study, Endres[4] found that only 21% of 96 newspapers surveyed used a database system. Database users in his study were primarily general assignment reporters who relied on a database for background information. Interestingly in this study, news personnel desiring a database search had to do so through a librarian who controlled how much and what type of information would be accessed.

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[2] George Garneau, "Cutting costs, boosting prices," Editor & Publisher, January 5, 1991, p.38-39.

[3] Anthony Smith, Goodbye Gutenberg: The Newspaper Revolution of the 1980's, (New York: Oxford University Press, 1980), p. 206.

[4] Fredric F. Endres, "Daily Newspaper Utilization of Computer Data Bases," Newspaper Research Journal, 7:29-35 (Vol. 1).

Kerr and Niebauer[5] studied database use of 40 editorial writers and found that 68% either seldom used or never used information retrieval systems in conducting their research. This study also provided evidence that editorial writers who did not have to conduct a database search through a third party such as a librarian were more likely to use databases and to be more satisfied with their use.

Considering the possible tension between librarians and reporters over control of database use, the survey of journalists and newspaper librarians conducted by Jacobson and Ullman[6] addressed comparative perceptions of the two groups. They found that 75% of the librarians thought database use led to more research and improved news coverage; 71% of the journalists said databases were an "important" or "very important" component of news reporting. Comparing the assessments of the two groups, more librarians than reporters believed databases widened geographical coverage. More librarians (32%) than journalists (10%) were concerned that database searches would "bury" journalists with data. Overall results indicated more agreement than disagreement about the value of databases in news reporting.

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[5] John Kerr and Walter E. Niebauer Jr., "Use of Full Text, Database Retrieval Systems by Editorial Page Writers," Newspaper Research Journal, 8:21-32 (Vol. 2).

[6] Thomas L. Jacobson and John Ullman, "Commercial Databases and Reporting: Opinions of Newspaper Journalists and Librarians," Newspaper Research Journal, 10:15-25 (Vol. 10).

In another study done for the National Institute for Advanced Reporting[7] ,fourteen news reporters and editors from three newspapers and one broadcasting outlet were trained to use the LEXIS/NEXIS databases. Interviews before and after the usage periods were conducted. Experience in using these databases in their work led the participants to report that use of online information services had a positive effect on the delivery of the news (p.4). Also, the study's participants found databases were "extremely useful" for deadline reporting and to obtain greater background material for stories (p. 18). Participants identified potential negative impacts of database use to be over-reliance on databases; overwhelming readers with non-pertinent information; using information from online without proper attribution; and, the potential for inaccurate information being replicated (p. 15).

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[7] James Brown, Sherry Ricchiardi, Leonard Fischer and Andrew Schneider, "LEXIS/NEXIS Spot News Research Project," National Institute for Advanced Reporting, 1990.

In a largely anecdotal article, Miller[8] also wrote about reportorial use of the NEXIS database. He cited examples of reporters using NEXIS as a comprehensive news morgue, as a source for major new stories, as a quick check for historical information and to read past stories of other reporters. He concluded, "...it is clear that those who can afford databases and learn to use them effectively will have an edge in the news business" (p. 53).

Five years after his original article, Miller[9] took another look at how the database revolution was faring at newspapers. He found that newspapers doing online database searches had quadrupled from 1982 to 1986. However, in-house databases, like the one created by the Atlanta Journal-Constitution for its Pulitzer Prize-winning series on the discriminatory trends in the Atlanta mortgage lending industry, were much slower to develop. Miller observed, "The time is now ripe to pursue computer journalism. As an increasing amount of public information becomes computerized, the computers needed to analyze it are becoming cheaper and also faster" (p. 36).

As results from these studies indicate, database use in the news reporting process is moving out of the initial trial stage and into a wider adoption phase. Even new models of reporting strategies have been devised to take into account database use[10]. Jaspin[11] observed:

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[8] Tim Miller, "Information, Please, and Fast: Reporting's Revolution: Data Bases," Washington Journalism Review, September, 1983, p. 51-53.

[9] Tim Miller, "The Data-base Revolution," Columbia Journalism Review, September/October, 1988, p. 35-38.

> While a computer can make an enormous difference in the way journalists do their job, it is not a matter of sitting down at a keyboard and, with little or no effort, finding the information for a Pulitzer Prize-winning story...The computer study only forms the underpinning for the story, the foundation. The best stories still talk about people, their hopes, their dreams, their frustrations, triumphs and defeats. But a computer can point us in the right direction. (p. 14)

With improved access and searching techniques and the growing experience and expertise of reporters in using databases, more studies are needed to understand the role of database technology in the changing news industry.

METHOD

Four newspapers which are both subscribers and contributors to the VU/TEXT database agreed to participate in this study. The newspapers are the Times-Dispatch and the News Leader, both published in Richmond, VA; the Palm Beach (FL) Post and the Philadelphis (PA) Inquirer. Questionnaires were distributed to the reporting and editorial staffs of each newspaper. A screen question at the beginning asked that only those respondents who had actually used VU/TEXT complete the questionnaire. The focus of this study was to ascertain how databases are actually being utilized in newsrooms, rather than comparing non-users to users. This study does not attempt to measure the adoption curve of database use in the newsroom, but to describe how news personnel may actually use this information source on a day-to-day basis. A total of 131 completed questionnaires were returned.

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[10] Jean Ward and Kathleen A. Hansen, "Commentary: Information Age Methods in a New Reporting Model," Newspaper Research Journal, 7:51-59 (Vol. 3).

[11] Elliot Jaspin, "Out With the Paper Chase, In With the Data Base," speech delivered to the Gannett Center for Media Studies, March 20, 1989.

Items included in the questionnaire were drawn from the literature available on how reporters and editors use online databases. The following research questions guided this effort:

1. Was frequency of VU/TEXT use related to any factors such as database access, position, years experience, or age?
2. Do factors such as deadline pressures encourage database searches among newsroom personnel?
3. What was the frequency of utilizing an online database for specific news gathering functions such as backgrounding, finding sources, obtaining historical information, locating facts, data, statistics, etc.?
4. How do news personnel view the importance of a variety of database functions in the context of their news organization and the demands of their particular reporting assignments?
5. How do news personnel assess the quality, accuracy, comprehensiveness, placement and editing of stories using database information?

RESULTS

The results of this study indicate that over 80% of those answering the questionnaire had two years or more of experience using databases in their jobs with over 87% indicating database use of at least several times a week to daily use. Respondents from the four participating newspapers included 59 from the Richmond Times-Dispatch; 24 from the Richmond News Leader; 17 from the Palm Beach Post; and, 31 from the Philadelphia Inquirer for a total of 131. Data analysis revealed almost no significant differences in responses when data were examined by individual newspapers, although differences were evident when examined by other variables such as position held. Thus, the results discussed are aggregates from the participating newspapers.

The average number of years the respondents had been in the newspaper industry was 15.2 years and the average number of years in their current positions was 7 years; 46% had journalism degrees. Age ranges of respondents included the following: 26.7% under 30, 38.2% 31-40; 25.2% 41-50; 3.1% 51-60; and, less than 1% over 60. Although there are only data for age categories, users tended to be younger (under 40), as expected when studying the use of any new technology.

A breakdown of respondents by job title includes 43.5% reporters; 38.2% editors; 4.6% feature writers; 2.3% opinion writers; and, 3.1% columnists. Although the number of newspapers represented is small, the characteristics of the news personnel studied is sufficiently diverse to provide insights into the development of database use in journalism.

The first research question related to autonomy and access to VU/TEXT. The questionnaire included the following item: REGARDING AUTONOMY, HOW FREE ARE YOU TO GAIN ACCESS TO VU/TEXT?

41.2% I can use VU/TEXT anytime, including all databases within the system, via my personal password.

9.9% I can use VU/TEXT anytime, including all databases within the system, with my editor's (department head's, librarian's) approval.

1.5% I can use VU/TEXT only on a specified terminal centrally located (i.e., news library).

5.3% I can only request VU/TEXT material/searches via a third party, i.e., librarian or editor.

38.2% I can use only that portion of VU/TEXT which accesses material published by my newspaper.

When VU/TEXT access is examined by position held, significant differences were evident. Table 1 shows a breakdown of access by position. Of all the positions represented by the questionnaire respondents, reporters appear to have the most restricted access, while editors have the greatest access, closely followed by feature writers. (This difference is significant at the p .001 level, = 70.71.) Costs of online searching and the desire to control these costs may be reasons why reporters are more restricted than editors in accessing the entire database.

INSERT TABLE 1 ABOUT HERE.

Access factors also appear related to frequency of VU/TEXT use. Respondents indicated that 55.7% used the database daily; 32.1% several times a week; 6.8% occasionally; and, 5.3% once in a great while. When crosstabulated with VU/TEXT access, the data showed that no respondents who had access restrictions--such as needing to use a central terminal or having to request a VU/TEXT search through a third party--reported frequent weekly or daily database use. However, there were just as many daily users (N=31) who had open access to all VU/TEXT databases as daily users (N=30) who had VU/TEXT access only to the homebase newspaper. Frequent use is more closely related to the absence of locational or administrative barriers rather than to the freedom to use all databases within the VU/TEXT system.

Related to the second research question, previous studies indicated a tendency to use databases when deadline pressures are present. However, these data showed that while 64.1% of the respondents did use VU/TEXT under deadline pressure, 58.8% were likely to use the database when a long lead time was available. Indeed, 50.4% of the respondents indicated that time was not a factor in their decision to use VU/TEXT. Comments made in the open-ended question indicated that news personnel using VU/TEXT may encounter system shutdown difficulties, administrative protocols or computer slowdowns which affect usage patterns.

Other factors involved may be the types of news stories being written, with investigative or indepth pieces allowing more time flexibility.

One variable significantly related to the time factor was position held. Of those respondents who said they used VU/TEXT when a long lead time was available, 75% were reporters; 38% editors; 50% feature writers; 67% opinion writers; and, 50% columnists. (Chi square analysis showed these differences were significant at p .01; = 16.7; df = 5).

Frequency of use was also positively related to utilizing VU/TEXT when deadlines were imminent with 81% of the daily users and 57% of the frequent weekly users indicating using the database under deadline pressure. Interestingly, only one of the occasional users and none of those who seldom used the database accessed VU/TEXT when deadlines approached. This result may indicate a comfort zone for those more familiar with the database which serves their information needs when time is of the essence.

Respondents were presented with a list of possible VU/TEXT uses and asked to indicate frequency of use, as related to the third research question. Results are shown in Table 2.

INSERT TABLE 2 ABOUT HERE.

The top five most frequent uses appear to be relating to obtaining background material--a use of databases corroborated by previous studies. Fears that database access will homogenize news content are not supported in this study as the least frequent uses were comparing story leads or exposition.

Some use items are significantly related to other variables, however. Respondents who reported daily or frequent weekly VU/TEXT use were more likely to access this database for background information on a topic or a person; for statistical data; and, to check sources. (Chi square analysis showed significant relationships, at the p .05 level or better between frequency of use and these variables.) The item regarding checking specific reporters' stories was more frequently used by the editors (78% of this group) than any other position; whereas, more reporters (71% of this group) used VU/TEXT to check something they had written. These results may be expected given respective job duties.

The fourth research question focused on the importance of database use to the news organization. Table 3 reports responses to a question on rating the importance of twelve VU/TEXT functions to the news organization.

INSERT TABLE 3 ABOUT HERE.

Verifying factual content, as the highest rated function, also showed a significant relationship when crosstabulated with respondent position. One hundred percent of the opinion writers and columnists and 88% of the editors identified this function as very important, whereas only 60% of the reporters and 40% of the feature writers listed this function as a very important. (Significant chi square, p .01, = 26.4, df = 10)

On the other hand, the function of providing anecdotes or human interest sidebars did not appear as important to editors

(33% said this item was very or somewhat important) as it was to reporters (60%), feature writers (66%), and opinion writers and columnists (100%), who rated this function similarly. These differences in perceptions of VU/TEXT functions may be related to the practical application of database use which specific news personnel have learned to be effective in doing their jobs.

The fifth research question focused on issues related to increased quality in news stories when VU/TEXT is utilized. Respondents were asked if stories using database information were of higher quality. Forty-four percent said stories were of better quality, 46% said there was no difference and 4% said stories using database material were of lower quality. When asked if stories using database information needed more or less editing, 65% said they needed about the same amount of editing, 11% said more editing and 7% said less editing. Placement given stories developed using database material was seen as no different than non-database stories by 64% of the respondents, more favorable by 12% and less favorable by 9%. These results may indicate an ambivalence about how database enhanced news is evaluated within the news organization. News personnel may be unsure about the relationship between news quality and the use of database information.

Further ambivalence emerged in another series of questionnaire statements. Respondents were provided a list of possible database use advantages and asked to react as to whether they strongly agree, agree, are uncertain, disagree, or strongly disagree. Table 4 shows the results.

INSERT TABLE 4 ABOUT HERE.

Most respondents expressed strong agreement that databases allow for more comprehensive stories, but agreement on other possible advantages is far from conclusive. One advantage relating to producing award-winning stories was more positively viewed by the younger respondents. Of the under 30 group, 21.2% strongly agreed or agreed with the statement, whereas 6.8% of the age 31-40; 6.6% of the age 41-50 and none of the 51-60 group said likewise. (These results were significant using chi square analysis, p .01, = 44.3, df = 25). Respondents are, for the most part, very familiar with the VU/TEXT database, yet they do not on the whole express high certainty about its value or possible advantages to the news process. This ambivalence may stem from lack of visible rewards, from organizational factors or from personal experiences relating to database use.

CONCLUSIONS

This study specifically focused on newsroom personnel who actually used VU/TEXT in the news process. An underlying assumption of the study was that persons actually familiar with using this database would give greater insights into how this or any other database might support, enhance or influence the news reporting process.

One of the key implications of this study is that because the prime users of newsroom database technology are relatively young, as these personnel become more expert in database use, their demands for greater autonomy and for organizational support related to database use will increase dramatically. Their use of database technology will undoubtedly mature in complexity and variety as this technology becomes fully integrated into the news process, changing the fundamental process by which news is written. Currently, VU/TEXT is used in many instances as a news morgue--for checking and backgrounding. But expertise in these tasks leads inevitably to more extensive usage--for trends, story ideas, research data. If innovative, the news library will respond to these uses by becoming an information broker and manager, not only for internal clients like reporters, but external clients as well. News processes may change by accessing a variety of databases, not only after a story is written to verify information, but before, during and after the story's creation--the database information becomes an intrinsic component of all aspects of the process.

The second implication of this study is that corporate culture and institutional character expressed through management style are critical to the cost effective integration of database technology into the news process. For example, the entire issue of database access is a managerial decision but is linked to database use and developing expertise among news personnel.

Moreover, during an era of flat circulation, the productive use of database news information would appear less costly than hiring more personnel. As pressures to produce news targeted for specific, narrow audience segments increase, uses of databases appear to be perfectly suited to the creation of such targeted news content.

The third implication is that perceptions on the part of the database users in this study indicate an uncertainty as to how quality and productivity in the newsroom may be related to effective database use. The degree of ambivalence is puzzling. Internal audits by individual newspapers are needed to determine if insitututional or administrative barriers exist which appear to stymie productive database use. Unresolved ambivalence may lead to the emergence of individual adjustments to organizational barriers which could be counterproductive. For instance, a highly motivated and expert database user can and will find methods to circumvent managerial myopia--but in highly individualized ways which may not always be cost effective or in the best interests of the news organization.

There are far too few studies which examine the organizational context, work group, job characteristics and individual characteristics which interact with technological innovation to produce change, particularly in media industries.

(See Nelson[12] for an excellent review of existing studies.) Databases such as VU/TEXT represent a substantial resource, but their use must be studied in the context of the total news organization, not only on the individual use level.

The last implication is that database use by newsroom personnel is clearly not a novel activity which will soon fall into disuse. Unlike earlier consumer trials using electronically delivered newspapers (see Henke and Donohue[13]), news professionals persist in mastering database technology, sometimes regardless of the barriers. In fact, there seems to be some preliminary evidence that use increases over time.

As one reporter commented in the open-ended question of this survey, "VU/TEXT is a tremendous improvement over the traditional morgue. We appear to use it for very little else. Reporters seem not to be encouraged to used databases of other papers because of the expense and lack of familiarity of management and editors with the benefits of such research." Another reporter comment also attests to possible future directions: "VU/TEXT is an essential part of reporting. I used it several times a day for generating story ideas, gathering information and evaluating my own progress. I only wish I had even more access to databases." Among news personnel who used VU/TEXT, reliance on databases appear to be a solidly entrenched news gathering habit, one which is certain to expand both in quantity and quality.

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[12] Debra L. Nelson, "Individual Adjustment to Information-Driven Technologies: A Critical Review," MIS Quarterly, March, 1990, p. 79-98.

[13] Lucy L. Henke and Thomas R. Donohue, "Teletext Viewing Habits and Preferences," Journalism Quarterly, 62:542-545 (Winter, 1985).

COMMERCIAL DATABASE USE IN THE NEWSROOM

CALLING UP CYBERSPACE: ON THE THRESHOLD OF TELECOMMUNICATIONS RESEARCH

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CALLING UP CYBERSPACE: ON THE THRESHOLD OF TELECOMMUNICATIONS RESEARCH

Science fiction writer, William Gibson, is credited with creating the metaphor of cyberspace. In his 1984 novel, Neuromancer, Gibson described it as "a consensual hallucination....A graphic representation of data abstracted from the banks of every computer in the human system" (Gibson, 1984, p.51). This paper builds upon Gibson's idea to suggest the perspective that virtual reality might well be a new medium of communication created from the convergence of several technologies: supercomputing power, interactive video, sophisticated computer graphics software -- including 3-D and novel advances in human/machine interfacing -- and the expansion of telecommunications bandwidth and connectivity to provide the high speed sharing of massive quantities of data.

For the purposes of this perspective, cyberspace is best described as the indeterminate psychological space created by virtual reality technology. An easy handle on the cyberspace concept comes from the familiar use of the telephone, whereby both parties to a conversation are in different geographic spaces but seem to be in a consensual, indeterminate space that can be as intimate as a whisper in the ear.

While yet in the experimental stage, virtual reality technology promises to extend human presence by adding graphic and haptic components to the communication experience (Brooks, Frederick, Ouh-Young, Batter, and Kilpatrick, 1990). Virtual reality differs from previous audio and video analog communication technologies in that it offers complete control of the social presence of the persons communicating. Once digitized, a signal can be modified extensively. The appearance and setting of communicators can be created or highly mediated by them or others. One can literally wear any mask, possess any form, and appear in any setting that can be imagined and created on computer graphics software (Lasko-Harvill, 1991).

Although in the experimental and developmental stage, virtual reality technology offers many opportunities to communications researchers interested in the social and psychological origins of needs and uses of media. This paper explores some of the implications of virtual reality as computer simulated environments for communication scholars and researchers.

Increased Mediation of the Human Environment

As revolutionary and futuristic as virtual reality may sound, its novel terms hide the basic characteristics of electronic environment and interactivity that began with the telegraph 160 years ago (Czitrom, 1982). Invention of the telegraph and its subsequent use to conduct the American Civil War from the White House began extending human senses with technology and launched an era that has spawned notions such as McLuhan's "global village" (McLuhan & Forsdale, 1989). With the advent of each new communication technology, humans were able to extend voice, ears, eyes, and symbolic presence further beyond their bodily limits. Point-to-point interaction capabilities of telegraph and telephone created a network of increasing connectivity as it carried business and entertainment communications. The telecommunication network to support a mass consumption economy remains for technologies such as computer networks to exploit. Now, with the addition of supercomputing power, virtual reality offers conversational interactivity to the extension of touch and motor skills as well as sight, sound, and vision.

The Key Role of Interactivity

To a researcher in computer science, the ideal level of interactivity with machines provides the give and take of normal human conversation with interruptions, digressions, simultaneous transmission, response delays to contemplate, limited forward thinking, and a seeming infinite database upon which to draw (Brand, 1988, pp. 46-49). Another, rigorous, communication definition of interactivity specifies, "Full interactivity (responsiveness) differs from reaction in the incorporation of reference to the content, nature, form, or just the presence of earlier reference" (Rafaeli, 1988). What is important to distinguish is the responsiveness of interactivity as used in this discussion departs from simple alternation of stimuli and responses. The responsive nature of interactive video to requests and choices is due to the information handling capacity of computers in general and supercomputing in particular. The interactivity of virtual reality differs from interactive video in that the user is in the picture, participating in a simulated environment. With television, pictures and sounds of the world come to our viewing sets; with interactive video we compose personal viewing worlds; but with virtual reality we enter the cyberspace experience of the newsroom or the fighter pilot's cockpit. The difference is between viewing and participating.

Communication Characteristics of Cyberspace

Time shifting is a communications application of cyberspace derived from interactive video. Because of the audiovisual recording ability of video and the storage management ability of computers, a presence --

human or otherwise -- *can be held, placed,* called upon, played back, revised, and rerecorded at any time. Related to time shifting is the ability of virtual environments to shift space because -- like time -- it is recorded as data.

The Increasing Role of Computing in Communications

The increased computing power and telecommunications that provide for improved interactivity and human presence have created a new realm for communication behavior. As digital technologies become more pervasive, the amount of information at a person's disposal will increase the availability of graphical landscapes that can be created for personal participation. The more information that comprises a communication, the more it can accommodate the visual, auditory, and haptic nuances of the humans communicating.

New Perspective for Telecommunications Research

Ordinarily when thinking about communication technologies, we focus on the hardware or sometimes the software as the locus of the technology. However, computer simulated environments are the area of emphasis in virtual reality. The analogy to telephones would be to concentrate conceptually on the shared intimate space of the talkers rather than the handheld instrument or the switched network as the relevant part of the technology.

THE CHALLENGE TO TELECOMMUNICATIONS RESEARCH

Current understanding of communication in cyberspace occurs at the intersection of the disciplines of human cognition and computer science. The challenge for communication scholars is to provide the theoretical framework for combining modes of expression -- such as language -- with social organization and to raise communication scholarship to the level of development now attributed in the human factors literature to the cognitive and computer sciences. The interactive nature of virtual reality technology especially beckons to communications researchers.

How do models of communication account for interactivity in its conversational form? Communication models have been derived from existing media -- from speech to computers. Cybernetics with its feedback loops provides models close to the kind of interactivity possible in a telephone conversation.

Play and Intrinsic Motivation

The Play Model of Communication, offered in 1967 by William Stephenson suggests a direction which focuses less on maintaining the flow of information and more on the function of the communication. He posits two primary factors in mass media communication: personal use of media in order to conduct non-purposive conversation with other people, and the cultural education of audiences. In other words, Stephenson, like James Carey (1989, p.30.), is less concerned with the information that is transmitted than how people use it to "commune" with each for the pleasure of conversing and transforming their social reality. Media, for their part, help to maintain and build community. Communication for

Stephenson occurs when people interact. An individual interacts with the media to glean what is useful according to developed interests. The rest goes on by, unread or forgotten. The real communication can best be described as a playful, i.e. non-purposive activity. For example, communication media may serve a socialization role if understood as a collection of games which use entertainment to induce the audience to play, internalize and identify with values and behavior displayed in the media (Stephenson, 1967). Conversation has the intrinsic reward of communing with another over agreed upon topics. Conversation is an interactive process of interruption, pauses for recall, postponement for later recall or presentation, and no finite end. One cannot be a passive recipient according to Stephenson's model. Even reading a newspaper or watching TV has active elements of seeking, filtering, and storing to it. The motivation to act is intrinsic, i.e. for the pleasure of it (Kubey & Csikszentmihalyi, 1990).

Cognitive and Social Theories

Communications scholars may have to adapt theories of cognition to social conditions. Scholars now working in this area have been studying factors which contribute to the use of computer-mediated communication technologies in organizations. The role of critical mass and pre-usage expectations for individuals evaluating electronic message systems focuses on media chosen to perform tasks (Rice, Grant, Schmitz, & Torobin, 1990). Social presence afforded by a medium is discussed in relation to its use for interpersonally involving tasks (Steinfield, 1986). Features of the system, perceptions of users, personal characteristics of users, geographic dispersion, and perceived privacy are also factors which have received some attention (Kerr and Hiltz, 1982). Many scholars have recognized the need for studies on uses of interactive, computer-mediated communication technologies in organizations (Hiemstra, 1982). Outside of communications, scholars in the computer and cognitive sciences are experimenting with graphical interfaces that can accommodate several users performing different tasks at the same time (Malone and Crowston, 1990). However, many questions remain unexplored concerning motivations to informally use the recent proliferation of commercial, private non-commercial, and public electronic messaging systems. Electronic bulletin boards and chat lines possess the voluntary usse, ease of access, text and graphic capabilities, realtime conversational modes, and convergence of computer and telecommunication technologies that suggest affinities with possible uses and characteristics of virtual reality.

Social Presence

Computer supported interactivity and virtual reality place the viewer in a point of view that makes the viewer into a participant. The viewer moves and the scene changes. If the viewer doesn't move the scene might continue to roll on as though viewed by a parade bystander. The potential of virtual reality, though, is to invite the viewer in as a participant inasmuch as the environment is recreated in response to the viewer's movements. With intrinsic motivation built into the operation of the program -- i.e. it changes when the viewer decides to change it -- social presence becomes an important factor in media experience. Virtual reality researcher Ann Lasko-Harvill of VPL (Visual Processing Laboratory) has pointed out that in cyberspace we will need to construct our presence, our identities, much as users of Email and Minitel take on "handles" (Lasko-Harvill, 1991). In media such as broadcast TV, radio, and movies, the viewer is invisible. But in virtual reality the viewer is the point of view with a presence in the scene being viewed. Questions for telecommunication research:

how is presence expressed;

how much is necessary for the viewer to feel a participant?

How will the viewer prefer to be portrayed? A face? A mask? A hand? A body? By sounds, feel?

Are there comfort levels associated with interactive social presence?

How much of another person needs to be expressed?

How is affect shown?

What technology communicates affect digitally?

Given that computing power is not unlimited, what are minimal tolerable ranges of "natural" verbal and visual language needed for different kinds of interaction? Given that persons may digitally fabricate and modulate their appearance, voice, and feel how does one assess who or what one is dealing with?

These questions are only now being raised by cognitive researchers, yet they reach to the core of communication acts and functions.

Reconstituting Affect

Communications have historically been the common grounds for theories developed by other disciplines. In addition to the reintroduction of theories of motivation into studies of computer use, a reexamination of psychophysiology may be appropriate in order to study questions of communicating affect by facial and body language.

ENTERTAINMENT AND CYBERSPACE

Because of the distinct video-game like quality of virtual reality that stems from computer graphics, a new entertainment medium is opening up for media researchers. Scientists and engineers working on problems of creating the algorithms to define movement in cyberspace (Brooks et al., 1990) see the most immediate applications in entertainment. Bricken of the Human Interface Laboratory at the University of Washington notes that "the digital movie business is a big consumer of Cyberspace Design Tools, software that helps them to craft a digital movie" (Bricken, 1990). Already in existence (at Autodesk, creators of AutoCAD) are The Exercise Cybercycle which offers a scenic digital movie which varies only according to how fast you're pedaling; Cybergolf with links of your choice with a stationary physical ball and treadmill; and WaterWorld, "an undersea digitized hub experience just installed at Marriott's Under Marine World Out of Africa USA." Four hundred cyberports, each with personal chair and headmount "provide a digitized view of real underwater life that customers can interact with through food dispensers and a water jet" (Bricken, 1990). The personal recreation market could become the transpersonal recreation experience as people join virtual networks of special interest simulation games.

The first virtual reality arcade game, "Battletech Center," opened in Chicago in early August, 1990. By the end of the month, more than 10,000 people had played the game, which resembles a movie set and cost $3.5 million to open. War game features direct an environment bristling with technologies and implications for group communications in a virtual space (Hochswender, 1990). Like movies and video games, the experience of spectacle and the social controversies surrounding arcades may do much to develop audience acceptance and demand.

The Spectator

As do other media, virtual reality offers simulated experiences without devastating consequences to the viewer. However, the replication of reality and sense of "being there" in computer simulated environments may cause conflicting physiological responses. For example, simulator sickness has been known for many years by aircraft pilots. It seems to come from a cue conflict between simulated motion and what pilots know aircraft motion feels like ("Sickness", 1989). Research on the experience of the spectator is needed.

How "safe" can simulated thrill experiences be?

Virtual worlds can be emotional as well as information gathering experiences. At the personal level, preprogrammed films may be part of the virtual reality experience but with the added possibility of rapid changes of location, alterations of mood music and color under the control of the participant. As with all new media, people will want research on how spending time in virtual reality takes away from other familiar activities. And, indeed, lifestyles may change as they did with TV. Concerns about the physical and social development of young people who play virtual reality games may be similar to issues that emerged along with video games.

Virtual reality criticism will be needed.

Will young people look to interactive simulated environments for companionship?

> Will role playing with simulated created personalities stimulate parasocial relationships?

The Narrative

From developing characters to telling stories, we can expect to see changes in narrative forms in cyberspace (Moulthrop, 1991; Bukatman, 1991). Theories of narrative and the role of the spectator may have to adopt phenomenological theory to study active participants who can change personal point of view.

> How will participants be incorporated into stories? Will the degree of pleasure derived from a virtual reality experience be a function of one's ability to act? Are the aristotelian theories of classical drama more appropriate? (Laurel, 1990).
>
> At the group level, how will the mythologies of popular culture be rehearsed as experiences?

Increased interconnectivity and participation in virtual worlds of unstructured role playing will raise issues of human social adaptation to an increasingly mediated environment. Along with concerns for the construction of social reality will come subcultures with codes, values, and evolving forms of communication to be studied.

> Given the opportunity, how will people choose to construct their social presence?
>
> Will virtual reality experiences come bundled as prepackaged copyrighted entertainment created by media conglomerates who can afford high production costs?

Education & Information

Communication researchers need also to be vigilant for emerging uses of the technology once the new media has supplanted dependency on older media.

Will the new medium promise original educational experiences but then wither for lack of funding and guidance?

Certainly with the introduction of media that provide steadily improved access to information as have the telegraph, the press, radio, and television, will people be better informed? Will experience begin to eclipse other modes of acquiring knowledge just as TV has unburdened printing as the prime source of information about the world?

Policy

Providing guidance in cultural matters has long been a function of media, even as a free press (Stephenson, 1967).

At something like the national level, will ruling bodies wish to use virtual reality to create the experience of propaganda through something like role-playing scenarios?

Will government utilities see their interests served by making virtual reality gear readily available as France did with Minitel?

What policies ought to be enacted, if any, to protect "true" experiences from ones that are digitally altered?

Adoption and diffusion of innovation studies may become important with regard to education and business.

Will individuals who can afford virtual reality have a social, cultural, or economic edge over those who cannot?

Will social policy seek to avoid spreading class differences that widen as a result of the high cost/high benefit of learning through virtual reality experiences?

Interconnectivity and Virtual Reality Research

With increased bandwidth on our wired network will come the possibility for long distance shared experiences. Connectivity will provide communication researchers with possible access to study the very respondents who use the network, much as television and cable use some form of an audience participation measure that is attached to the TV set. A question that ought to arise early might be "what is the role of a participant observer in a simulated environment group experience?"

Will the participatory aspect of virtual reality allow researchers to control the reactive effect they have on observing behavior?

Will guarantees of privacy need to be enacted?

Where to Start

Look to users and media that have the same essential characteristics to be met by virtual reality technology. There one can expect to see substitutions of the new medium.

One such medium gaining popular acceptance is electronic messaging systems. Also known as email or bulletin boards, computer-based messaging systems and information sources display the interconnectivity that the combination of computing power and telecommunications bring.

Strangers can meet on electronic bulletin boards and converse without restrictive social practices associated with face-to-face interaction. Realtime interactive "chat lines" have the flexible characteristics of the highest level of interactivity. Affect has been displayed with typographic happy faces, winks, and frowns. While text predominates on bulletin boards, voice messaging could apply existing popular technology. With graphics and voice in the easily foreseeable future on electronic bulletin boards, their widespread connectivity could lead to rapid diffusion. These same electronic bulletin boards are often participants of virtual world games where one is assigned a role and one travels through "rooms" meeting and attempting to overcome obstacles. One of the most popular, Habitat, is accessed primarily in Japan where people create lives in a virtual city. They elect officials, enact laws, and deal with criminals. Games have given way to real policy decisions in Santa Monica, California, where the city maintains an electronic bulletin board. Citizens can and do get involved in solving community problems (Wittig, 1991).

The synthesis of telecommunications, computer software, and inexpensive hardware that electronic messaging systems offer may bring cyberspace into the domain of communication research. But for communication research to cross the threshold into cyberspace may require the adoption of new or additional cognitive and social psychological theories. Once opened, the fields of research for education, entertainment, and business will expand along with the enlarged capacities of this converging technology called virtual reality.

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THE EFFECTIVENESS OF SIDEBAR GRAPHICS

by

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A paper presented to the Visual Communication Division of the Association for Education in Journalism and Mass Communications.

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Abstract

This study attempted to show whether a bar chart that accompanied a news story aided reader comprehension. Two versions of a graphic and story were tested against a story alone, a story and table, and a story and sidebar story. Four accuracy scores were computed, and in almost every case, subjects who read the story and sidebar story had the highest comprehension scores. The results suggest that graphics need to be kept simple and that they need to contain more explanatory information.

Introduction

People today are on the run, and newspapers have begun to realize that if they are to attract readers, they must run alongside them. Increasingly, informational graphics have become a part of this attempt to lure time-pinched readers. Following the lead of USA Today, newspapers have begun catering to a generation weaned on television.

"The great demand for informational graphics has come largely from a recognition that newspaper readership is declining and that newspapers must become more effective at visual communication," said Roger Fidler, Knight-Ridder's director of graphics and newsroom technology.[1]

That demand is growing. In a 1987 survey of 93 newspapers with circulations of 25,000 and above, Utt and Pasternack found that 75 percent used graphics wires, and 56.7 percent regularly used informational graphics on Page 1.[2]

In a 1988 survey of 350 members of the American Society of Newspaper Editors, Howard Finberg found that 92 percent of newspapers planned to use more informational graphics in the ensuing five years, and 90 percent said graphics would play an even bigger role by the year 2000.[3]

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[1] Roger Fidler, "The graphics revolution," Graphics '89, a report by the Associated Press Managing Editors Graphics Committee (September 1989), p. 4.

[2] Sandra Utt and Steve Pasternack, "How They Look: An Updated Study of American Newspaper Front Pages," Journalism Quarterly 66:621-627 (Autumn 1989).

"These are the glory days of informational graphics, and there is no end in sight," said Finberg, assistant managing editor of The Arizona Republic.[4]

Because the widespread, daily use of computer graphics is relatively new, so is most research about modern journalistic graphics. Much of the research focuses on graphics used alone, even though Smith and Hajash found in a content analysis of 30 daily newspapers that 71.2 percent of informational graphics were used with stories.[5]

Karl Gude, art director for Associated Press NewsGraphics, wrote: "News graphics have only one purpose, to convey the news. ... When a story gets space for a graphic alongside of it, you can bet it's a pretty important story and the readers will think so, too."[6]

Much of the move toward graphics has been based on the assumption that readers need something visual to help them understand news stories.

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[3] George Garneau, "Infographics: Editors believe the use of news graphics will continue to grow," Editor & Publisher, Oct. 22, 1988, p. 44.

[4] Pamela M. Terrell, "Art: Newspapers' historically gray pages have come alive with an explosion of color graphics, many of them computer-assisted," Presstime, Vol. 11, No. 2 (February 1989), p. 20.

[5] Edward J. Smith and Donna J. Hajash, "Informational Graphics in 30 Daily Newspapers," Journalism Quarterly 65:714-718 (Fall 1988).

[6] Karl Gude, "The art of news graphics," Graphics '89, a report from the Associated Press Managing Editors Graphics Committee (September 1989), p. 7.

Turnbull said, "The understanding of complicated subjects can often be lost in a deluge of words but be clarified if explanatory illustrations come to the assistance of verbal elements. The presentation of virtually all statistical data can be aided by illustration."[7]

That summarizes many of the assumptions under which newspapers have proceeded. But research, at least about the effectiveness of modern graphics used with stories, is scarce and sometimes contradictory. Research is especially lacking in the area of graphs used as sidebars to news stories, the direction in which this study proceeded. Specifically, the study attempted to show whether a modern, computer-generated bar chart that accompanied a news story aided reader comprehension.

Review of Literature

The Orange County Register, in its Graphics Handbook for Editors and Reporters, says that graphics serve two purposes: to visually restate the main point of a story, and to act as a stand-alone visual sidebar.[8]

As Stark and Hollander said, graphics "should help the reader understand information better, whether that information is in the form of statistics, as shown in charts and graphs, or in the form of diagrams and illustrations taking the reader through an event."[9]

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[7] Arthur T. Turnbull and Russell N. Baird, The Graphics of Communication, 3rd ed. (New York: Holt, Rinehart and Winston, 1975), p. 100.

[8] The Orange County Register, Graphics Handbook for Editors and Reporters, p. 1.

Their experiment backed such reasoning. They found that an informational graphic describing a plane crash aided subjects' ability to recall facts about a related news story. They also found that when a photograph accompanied the story and graphic, readers were even more accurate in recalling facts about the story.

Those findings are consistent with research by Baxter, Quarles and Kosak. They found that photographs, especially large photographs, drew readers to accompanying news stories and aided recall of information from the stories. They said their experiment indicated that large photographs caused readers "to stop, think, and thus imprint the information in their memories."[10]

Vernon's findings were less conclusive about the benefit of a photograph used with a story. He wrote:

> Though interesting pictures might stimulate people to read articles which they would not otherwise look at, there is no guarantee that they will understand such articles or remember them correctly. Indeed, their recollections may be incredibly garbled.[11]

Wainer made a similar warning. He said that "the fact that a graph is so eye-catching may have the unfortunate result that many people look at the graph and never read the story."[12]

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[9] Pegie M. Stark and Barry A. Hollander, "Information Graphics: Do They Help Readers Understand News Events," a paper presented to the Visual Communication Division of the Association for Education in Journalism and Mass Communication (August 1990), p. 7.

[10] William S. Baxter, Rebecca Quarles and Hermann Kosak, "The Effects of Photographs and Their Size on Reading and Recall of News Stories," ERIC Document ED 159 722 (August 1978).

[11] M.D. Vernon, "The Value of Pictorial Illustration," The British Journal of Educational Psychology 23:180-187 (November 1953).

Pasternack and Utt found that readers turned to graphs and charts because of both content and appearance, but mostly for content. They urged editors

> ... to be conscious of the fact that different readers will read the infographics either before or after they read the article or headline. A fine line must be walked between not repeating the content of the article in the infographic while at the same time realizing that some readers (scanners) may get all they need from the graphic and then move on.[13]

Vernon's studies about the use of charts and graphs cast doubt on the effectiveness of such visuals. He found that when a chart or graph was included with a written text of about 400 words, the accuracy of the subjects' recall decreased.[14] He found that the recall of material from a written text alone was "better arranged, smoother and more coherent" than when graphs were included with the text.[15]

Today's editors might find fault with Vernon's research because of the crudeness of his graphics when compared with modern computer graphics. However, later research by Roller found that text with graphs was more difficult for children to understand than text alone. She also found that graphs presented with text were more difficult to comprehend than graphs presented alone.[16]

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[12] Howard Wainer, "Making newspaper graphs fit to print," in Processing of Visible Language 2, Edited by Paul A. Kolers, Merald E. Wrolstad and Herman Bouma (New York and London: Plenum Press, 1980), pp. 125-142.

[13] Steve Pasternack and Sandra H. Utt, "Reader Use & Understanding of Newspaper Infographics," Newspaper Research Journal 11:28-41 (Spring 1990).

[14] M.D. Vernon, "Learning and Understanding," The Quarterly Journal of Experimental Psychology 3:19-23 (February 1951).

[15] Ibid., p. 22.

Research by Peterson indicated otherwise. She found that the subjects in her experiment reacted more favorably to a business report when a table or graph was included.[17] She also found that tables and graphs included with the report increased reader retention of information and decreased reading time. In each case, charts were found to be more effective than graphs. That makes sense considering that Peterson's subjects were all business students, people whose training would require frequent hands-on work with tabular data.

Still, the overall findings of Peterson's study agree with Vernon's assertion that complicated data are easier to understand in graphic form if a person has experience with graphs.[18]

Vernon warned, though, that "the individual untrained in the use of graphical material may find graphs very puzzling at first and difficult to interpret."[19]

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[16] Beverly V. Roller, "Graph reading abilities of thirteen-year-olds," in Processing of Visible Language 2, Edited by Paul A. Kolers, Merald E. Wrolstad and Herman Bouma (New York and London: Plenum Press, 1980), pp. 305-314.

[17] Becky K. Peterson, "Tables and Graphs Improve Reader Performance and Reader Reaction," Journal of Business Communication (Spring 1983), pp. 47-55.

[18] M.D. Vernon, "Learning from Graphical Material," The British Journal of Psychology 36:145-158 (September 1946).

Tufte was also concerned about a reader's potential difficulty in understanding a graphic, and he cautioned against the use of extraneous material, or "chartjunk."[20]

Tankard, however, found that cartoon-like informational graphics and three-dimensional graphs had more reader appeal than plain graphs. He also found that artwork combined with the graphics did not impair subjects' retention of information from the graphics.[21]

Kelly also found that such artwork did not seem to diminish reader comprehension of graphics. He questioned the validity of Tufte's theory of a "data-ink ratio," which suggests that extraneous material should be omitted from a graphic.[22]

Tankard suggested that artists, by combining cartoons with graphs, were "attempting to do the same thing that good newspaper writers often do when they are presenting numbers -- lighten them up with something more interesting."[23]

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[19] Vernon, "Learning from Graphical Material," p. 150.

[20] Edward R. Tufte, The Visual Display of Quantitative Information (Cheshire, Conn.: Graphics Press, 1983), p. 107.

[21] James W. Tankard, "Effects of Chartoons & Three-Dimensional Graphics on Interest & Information Gain," Newspaper Research Journal 10:91-103 (Spring 1989).

[22] James D. Kelly, "The Data-Ink Ratio and Accuracy of Newspaper Graphs," Journalism Quarterly 66:632-639 (Autumn 1989).

[23] James W. Tankard Jr., "Quantitative Graphics in Newspapers," Journalism Quarterly 64:406-415 (Summer-Autumn 1987).

Maintaining reader interest has become an important issue for newspapers today, given static circulation figures.[24]

Marty Petty, deputy executive editor of the Hartford Courant and a past president of the Society of Newspaper Design, said: "I feel very strongly that the success and failure of newspapers are in the hands of people who make visual decisions."[25]

That assertion is supported by research by Graber, who said that much of the information available in the average home today was unused because it had not aroused attention. "When people finish reading their newspapers, two out of every three stories have been excluded," she wrote. "... Only 18 percent of the stories in an average newspaper are read in full."[26]

White wrote, "People resist the effort of reading: It means work. But they do not seem to mind looking at pictures. So, the more information that can be packaged in non-words, the better."[27]

Hypotheses

Using that information as a guide, this study proceeded using these hypotheses:

H1 A sidebar chart that accompanies a news story is more effective than a sidebar story in providing numerical information.

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[24] Although Sunday circulation of daily newspapers rose about 28% from 1970 to 1988, combined daily circulation of morning and evening papers was nearly unchanged.

[25] Eric Rice, "In praise of newspaper graphics," Editor & Publisher, June 21, 1986, p. 44.

[26] Doris A. Graber, Processing the News: How People Tame the Information Tide, 2nd ed. (New York and London: Longman, 1988), pp. 96, 249.

[27] Jan V. White, Editing by design, 2nd ed. (New York and London: R.R. Bowker Co., 1982).

H2 A sidebar chart that accompanies a news story is more effective than a sidebar story in aiding comprehension of the main story.

H3 A bar chart that accompanies a news story is more effective than a table in providing numerical information and in aiding comprehension of a main story.

Experimental Design

For this experiment, a news story of 27.5 inches (24 paragraphs) was given to 237 students in two sections of a Marketing and the Mass Media class at a Midwestern university. One group of students got the story alone; one group got the story accompanied by a bar chart related to the story; one group got the story and the same bar chart adorned with shadow effects and artwork;[28] one group got the story and a table; one group got the story accompanied by a sidebar story that described the information in the graph.

The story described the history of Iraq's tension with Kuwait and other Middle Eastern countries and how that tension led to Iraq's invasion of Kuwait in August 1990. It also provided information about the region's strategic and economic importance to the United States. Stories about the invasion and the subsequent U.S. military buildup in the region were reported daily up to the time the experiment was performed. However, the story used for the study contained information that was reported more than two months before the experiment and was not discussed widely in the press thereafter.

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[28] The two pieces of artwork used in the graph were an oil well and a barrel from which oil was flowing. The artwork was similar to that used in graphics about the Persian Gulf crisis by the Associated Press and various newspapers in August 1990.

The graphic showed which countries had the largest oil reserves, which countries produced the most oil, and which countries used the most oil.[29]

The story and graphic were chosen partly because of findings by Smith and Hajash that graphics were most often found (58.4 percent) in general news sections of newspapers and most often dealt with business and economics (29.5 percent) or public affairs (23.7 percent).[30]

The story, the story and graphic, or the story and sidebar, were placed on horizontal 8 1/2- by 11-inch sheets of paper. The story, in four columns of 12.5 picas, was wrapped around the three-column horizontal graphic. A four-column headline was placed above the package. In version 4, the sidebar story replaced the graphic. It took up the same amount of space and had the same headline as the graphic. In version 5, the main story filled the space. In each case, the main story jumped to a second page. All the type and artwork were black and white.

Versions of the story and graphic were distributed in each class. The students were told that they were participating in a study, but they were not told the specific nature of the study. They were asked to read the material as they would something they found in a newspaper, and they were asked not to look at their neighbors' versions of the story.

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[29] The original graphic, by Inquirer artist Roger Hasler, was in the form of a bar chart, under the headline "Oil: Who has it and who uses it." It ran on page 10-A of the Aug. 5 Inquirer.

[30] Smith and Hajash, p. 716.

After about 10 minutes, questionnaires were handed out. Students were asked to write on the back of the questionnaire the number in the upper left-hand corner of the sheet they read. They were asked not to look at the questionnaires until told to do so. The stories were then collected, and the students were asked to complete the questionnaires. They were told that the questionnaire was not a test and that if they did not know the answer to a question, to record that.

The questionnaire contained 23 questions, 13 of which were used to test the hypotheses. Questions 7, 8, 9 and 18 were general knowledge questions about the Persian Gulf crisis. The answers to the questions were provided in the story that was used in the experiment, but anyone who had followed the gulf crisis even casually should have been able to answer them without reading the story. Those questions were used to screen the questionnaires. Any questionnaires that did not have at least three of the four questions correct were thrown out under the reasoning that the subject was either not paying attention when the experiment was conducted or was purposely supplying bogus answers.

A pretest was conducted using 36 students in an Advertising Research class. After the pretest, it was determined that the time allotted to read the story and graphic was sufficient and that the directions given to subjects were clear. For the final experiment, one question in the questionnaire was replaced and one was altered slightly to make it more understandable; the answers to one question were made shorter. Also, it was determined that the screens used on the bars on one chart needed to be made lighter.

Results

The experiment yielded 223 usable responses. Nine questionnaires were thrown out because the subjects failed to answer three of the four general knowledge questions correctly. Five were thrown out because they were incomplete. Of the usable questionnaires, distribution of the stories read by the subjects was as follows:

Version 1 (story with bar chart):	51
Version 2 (story with table):	44
Version 3 (story with adorned bar chart):	43
Version 4 (story with sidebar story):	41
Version 5 (story only):	44

Average age of the subjects was 21.05. Eighty-two were men, and 141 were women. The subjects consisted of 141 juniors, 78 seniors, two sophomores, one freshman and one graduate student. The mode of reading of daily newspapers reported by the subjects was one to three hours a week. The mode of reported viewing of television news was zero to two hours a week.

Among the five manipulations of the story used in the experiment, the version with the sidebar story yielded, in almost every case, the highest percentage of correct answers and the lowest percentage of incorrect answers and don't knows.

The distinctions between the other versions were not as clear.

Subjects who read only the story gave the highest percentage of don't knows in every case. The subjects who read the versions with manipulations of the graphic had similar scores in nearly all cases.

The version that included the sidebar story was also rated the easiest to understand. On a scale of 0 to 6, with 0 meaning "not at all understandable" and 6 "easily understood," the version with a sidebar had a mean score of 4.17. The version with the table had the second highest understandability score (4.0). The versions of the stories that had bar graphs received the lowest scores. A t-test analysis of the understandability scores showed that none of the differences in the means was statistically significant at the 0.05 level. One was significant at the 0.10 level, and four were significant at the 0.25 level. (See Table 1.)

Testing of Hypotheses

Hypotheses were tested using a method suggested by Stark and Hollander. Incorrect answers in each questionnaire were subtracted from correct answers, providing an accuracy score. A value of zero was given to "don't know" responses. For instance, a subject who answered six questions correctly, three questions incorrectly and four questions with "I don't know or I don't remember" would receive a score of three (6 - 3 - 0). A subject who answered no questions correctly, four questions incorrectly and nine questions with "I don't know or I don't remember" would receive a score of negative four (0 - 4 - 0).

Means were calculated for all 13 questions; six questions about information in the story only; a combination of six questions about information in the story and three about information in the story and graphic or sidebar; and four questions about information in the graphic or sidebar only. T-tests were then calculated comparing each of the five manipulations of the story.

> H1 A sidebar chart that accompanies a news story is more effective than a sidebar story in providing numerical information.

To test this hypothesis, scores from the graphic-only questions were compared. (See Table 2.) Subjects who read the story that contained the table had the highest mean accuracy score, and subjects who read the story with the sidebar story had a higher mean score than either of the groups that saw the bar charts. None of the differences (except against the control story, which had no sidebar) was statistically significant at the .05 level. The data led to a rejection of H1.

> H2 A sidebar chart that accompanies a news story is more effective than a sidebar story in aiding comprehension of the main story.

To test this hypothesis, two sets of data were used. The first was an accuracy score from six questions whose answers could be found only in the story. The second was a combination accuracy score from six questions whose answers could be found in the story and three questions whose answers could be found in either the story or the graphic.

On questions from the story, subjects who read version 4, which contained the sidebar story, scored significantly higher (p<.025 to p<.005) than subjects who read any of the other four versions. (See Table 3.) Results for the combination scores of story, and story and graphic or sidebar, were similar. In three of four comparisons, subjects who read the sidebar story scored significantly higher (p<.025 to p<.005) than the other groups. (See Table 4.) The data led to a rejection of H2.

> H3 A bar chart that accompanies a news story is more effective than a table in providing numerical information and in aiding comprehension of a main story.

To test this hypothesis, data from all 13 questions were compared. Scores of subjects who were exposed to the graphics were significantly higher (p<.05) than those who saw the story only. However, the scores of those who were exposed to the graphics were not significantly different from those who were exposed to the table. In fact, t-scores of those comparisons were among the lowest of any of the comparisons. The scores of those who read the sidebar story were again the highest of the five and ranked significantly higher (p<.05 to p<.005) than three of the four other versions. (See Table 5.) The data led to a rejection of H3.

Table 1
PERCEIVED UNDERSTANDABILITY OF STORY
(On a seven-point scale ranging from 0 to 6;
0 = not at all understandable; 6 = easily understood)

	Version of story				
	1	2	3	4	5
Mean response	3.88 n=51	4.00 n=44	3.77 n=43	4.17 n=41	3.98 n=44

T-TESTS

Versions of story	Mean scores	Statistical significance
4, 3	4.17, 3.77	p<.10 (t=1.31)
4, 1	4.17, 3.88	p<.25 (t=1.03)
2, 3	4.00, 3.77	p<.25 (t=0.733)
5, 3	3.98, 3.77	p<.25 (t=0.709)
4, 5	4.17, 3.98	p<.25 (t=0.678)
2, 1	4.00, 3.88	p>.25 (t=0.413)
1, 3	3.88, 3.77	p>.25 (t=0.373)
5, 1	3.98, 3.88	p>.25 (t=0.363)
4, 2	4.17, 4.00	p>.25 (t=0.568)
2, 5	4.00, 3.98	p>.25 (t=0.069)

Version 1 = story plus bar chart
Version 2 = story plus table
Version 3 = story plus bar chart with artwork
Version 4 = story plus sidebar story
Version 5 = story only

Table 2

ACCURACY SCORES FOR FOUR QUESTIONS FROM GRAPHIC
(Right answers minus wrong answers)

	Version of story				
	1	2	3	4	5
Mean score	0.61 n=51	0.82 n=44	0.56 n=43	0.63 n=41	0 n=44

T-TESTS

Versions of story	Mean scores	Statistical significance	
2, 5	0.82, 0	p<.005	(t=3.29)
4, 5	0.63, 0	p<.005	(t=2.73)
3, 5	0.56, 0	p<.025	(t=2.33)
1, 5	0.61, 0	p<.025	(t=2.27)
2, 3	0.82, 0.56	p<.25	(t=0.827)
2, 1	0.82, 0.61	p>.25	(t=0.644)
2, 4	0.82, 0.63	p>.25	(t=0.614)
4, 3	0.63, 0.56	p>.25	(t=0.23)
1, 3	0.61, 0.56	p>.25	(t=0.155)
4, 1	0.63, 0.61	p>.25	(t=0.062)

Version 1 = story plus bar chart
Version 2 = story plus table
Version 3 = story plus bar chart with artwork
Version 4 = story plus sidebar story
Version 5 = story only

Table 3

ACCURACY SCORES FOR SIX QUESTIONS FROM STORY
(Right answers minus wrong answers)

	Version of story				
	1	2	3	4	5
Mean score	2.04 n=51	1.91 n=44	2.34 n=43	3.27 n=41	2.11 n=44

T-TESTS

Versions of story	Mean scores	Statistical significance	
4, 1	3.27, 2.04	p<.005	(t=2.96)
4, 2	3.27, 1.91	p<.005	(t=2.82)
4, 5	3.27, 2.11	p<.01	(t=2.52)
4, 3	3.27, 2.34	p<.025	(t=2.03)
3, 2	2.34, 1.91	p<.25	(t=0.862)
3, 1	2.34, 2.04	p<.25	(t=0.692)
3, 5	2.34, 2.11	p>.25	(t=0.48)
5, 2	2.11, 1.91	p>.25	(t=0.399)
1, 2	2.04, 1.91	p>.25	(t=0.276)
5, 1	2.11, 2.04	p>.25	(t=0.161)

Version 1 = story plus bar chart
Version 2 = story plus table
Version 3 = story plus bar chart with artwork
Version 4 = story plus sidebar story
Version 5 = story only

Table 4

ACCURACY SCORES FOR NINE QUESTIONS FROM STORY, AND STORY AND GRAPHIC

(Right answers minus wrong answers)

	Version of story				
	1	2	3	4	5
Mean score	3.35 n=51	3.09 n=44	3.62 n=43	4.61 n=41	2.95 n=44

T-TESTS

Versions of story	Mean scores	Statistical significance	
4, 5	4.61, 2.95	p<.005	(t=2.7)
4, 2	4.61, 3.09	p<.025	(t=2.23)
4, 1	4.61, 3.35	p<.025	(t=2.15)
4, 3	4.61, 3.62	p<.10	(t=1.53)
3, 5	3.62, 2.95	p<.25	(t=1.15)
3, 2	3.62, 3.09	p<.25	(t=0.815)
1, 5	3.35, 2.95	p>.25	(t=0.759)
3, 1	3.62, 3.35	p>.25	(t=0.485)
1, 2	3.35, 3.09	p>.25	(t=0.442)
2, 5	3.09, 2.95	p>.25	(t=0.226)

Version 1 = story plus bar chart
Version 2 = story plus table
Version 3 = story plus bar chart with artwork
Version 4 = story plus sidebar story
Version 5 = story only

Table 5

ACCURACY SCORES FOR ALL 13 QUESTIONS
(Right answers minus wrong answers)

Version of story

	1	2	3	4	5
Mean score	3.96 n=51	3.90 n=44	4.19 n=43	5.24 n=41	2.95 n=44

T-TESTS

Versions of story	Mean scores	Statistical significance
4, 5	5.24, 2.95	p<.005 (t=3.367)
3, 5	4.19, 2.95	p<.05 (t=1.947)
4, 1	5.24, 3.96	p<.05 (t=1.855)
1, 5	3.96, 2.95	p<.05 (t=1.72)
4, 2	5.24, 3.90	p<.05 (t=1.68)
4, 3	5.24, 4.19	p<.10 (t=1.401)
2, 5	3.90, 2.95	p<.10 (t=1.375)
3, 2	4.19, 3.90	p>.25 (t=0.384)
3, 1	4.19, 3.96	p>.25 (t=0.353)
1, 2	3.96, 3.90	p>.25 (t=0.0863)

Version 1 = story plus bar chart
Version 2 = story plus table
Version 3 = story plus bar chart with artwork
Version 4 = story plus sidebar story
Version 5 = story only

Conclusions

The most interesting results from this study are the scores of students who read the sidebar story. Not only did the sidebar produce higher comprehension scores than the graphics in nearly every breakdown of the data, but subjects rated it highest in understandability. The two versions of the story that contained the bar graphs were rated the least understandable. Although the differences in understandability scores weren't statistically significant, they showed that the subjects weren't entirely comfortable with the bar graphs.

That may have had an effect on the questionnaire scores. If the subjects perceived the graphs as too difficult to read, perhaps they spent less time than they otherwise might have trying to interpret the data. When the data were presented in story form, the subjects seemed less intimidated and perhaps more apt to spend time digesting the information.

Another indication of this is version 4's low rate of "I don't knows" when compared with the other versions. Stark and Hollander considered a lower rate of "no answers" an indication that subjects had more confidence in their answers. That would seem to apply here, too. Subjects were told to mark "I don't know or I don't remember" unless they were sure of an answer. Those with the sidebar seemed more sure, and in all but one category, they were most accurate.

No significant difference was recorded in the scores from the three versions of the graphic. That seems to back up previous findings that artwork doesn't hurt graphics' ability to transmit information.[31] The only problem might be that in this case, the artwork made the graphic appear more complicated. The version of the graphic that had been adorned with shadow effects and artwork had the lowest mean understandability score. Again, the difference was not statistically significant, but it does suggest that the subjects were somewhat apprehensive about that graphic.

On all five manipulations used in this study, accuracy scores on the graphics-only questions were low. All but one of those questions dealt with the top two pieces of information in the three rows.[32] Questions were also limited to countries that the story focused on: Iraq, Kuwait, the United States and Saudi Arabia.

Those results suggest that the subjects didn't try to digest specific numbers from the graphic. That's understandable to an extent. Charts are usually intended to convey broad messages by means of specific visual information. Although specific numbers are usually provided for comparison or to enhance the authority of a graphic, readers aren't expected to pick up on every bit of information.

In this case, though, the graphics' complexity and lack of explanation likely played a role. It appears that subjects got lost amid the numbers and, lacking direction from the graphic, ignored them.

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[31] For instance, see Tankard or Kelly.

[32] The other question required a comparison of the second and fourth bars against the first.

If the results presented here stand up to further examination, they point to a challenge for editors, page designers and artists. During the past few years, newspapers have strived to make their pages more visual, working under the assumption that just about any visual display of information is better than text alone.

Past studies have shown that strong visual images can attract readers to accompanying stories and aid in comprehension of those stories. Strong reader interest may have played an important role in those studies, however. Stark and Hollander used a story and graphic about a fatal plane crash, and they found that the more interested subjects were, the more facts they remembered about a story. Baxter, Quarles and Kosak used a story and photo of a fatal car accident, and they found that a large photograph aided information recall. Peterson's study, in which tables and bar graphs aided comprehension of information, used a story about job opportunities and subjects who would soon be looking for jobs.

The story and artwork used in this experiment were more neutral in their appeal and give a different perspective of reader reaction and the effectiveness of graphics. A strong case can be made for using stories with high appeal in such studies. The problem is that most of the information in newspapers isn't compelling to most readers.

Suggestions

The data in this study suggest that even if readers are attracted by a graph, there is no guarantee that the graph will help them understand either the numerical data or the accompanying story. That leads to some suggestions for editors and artists:

1. Keep graphics, especially bar graphs and other types of numerical graphs, simple. "Keep it simple" is basic advice for any journalist, from reporters to photographers to headline writers. Even so, it is advice too often forsaken. Graphics are frequently looked upon as a way to pack a lot of information into a small space. The problem with that reasoning is that graphics can then overwhelm the reader. The graphics used in this study each had three categories with 10 bars and 10 numbers in each row. The data suggest that that is simply too much information for most readers to consume.

2. Include better explanations with graphics. The scores from the sidebar story show that in this study, subjects were more comfortable with the written word and were able to recall more information from a story than from a graphic. That suggests the need to explain graphs further. In its Graphics Handbook, the Orange County Register says that each graphic should include a paragraph that explains the graphic and why it is important to readers.

The graphic used in Stark and Hollander's study went even further than an "explainer." It included a step-by-step (1 through 5) labeling for readers to follow, in effect leading them through the graphic. The graphics in this study, as with many newspaper graphs, simply presented the information and left the readers on their own to decide what they should read, what they should compare and what they should interpret from the graphic. Better explanation in the form of text and labeling was definitely needed.

3. Use more scrutiny with graphics. Take a second look and ask whether they are truly clear and whether they clearly display pertinent and comprehensible information. Too often today, graphics are used simply because they are available. Newspapers seem to be so hungry for graphics that they'll print anything: graphics for graphics sake.

Greater care should also be taken in selecting the type of data for presentation. One subject in this study said he was confused by similar-size bars in the three rows of the graphic (manipulation 1), even though the numbers in each were drastically different. Others, no doubt, were similarly confused. The first column in the graphic compared numbers in the billions; the other two compared numbers in the millions.

Editors should keep in mind that not all readers may be comfortable with graphics. Graphs may save space, and they may be a visual way of presenting statistics or attracting a reader's attention, but they serve no purpose if the reader can't understand them. And if people aren't able to understand a graph, they'll likely do with it what they do with a story they perceive as too complicated: pass it by.

This study shouldn't be looked upon as an indictment of all informational graphics. The graphics used in this study weren't as effective as text in conveying information, but that doesn't mean that all such graphics fail similarly. Other research shows that simply isn't the case.

What this study does do is emphasize some weaknesses in one type of informational graphic, weaknesses that are too often seen in many other graphics. It also points to the need for more research about graphics. The number of studies is increasing, but some researchers seem to be taking the effectiveness of graphics for granted. This study, as do others, shows that not all graphics work all the time. The study of graphics is a fertile area. Further research should try to pinpoint what works, what doesn't work, and why. Some possible topics for further studies:

-- Complexity of graphics. At what point does a graph contain too much information?

-- Effectiveness of "explainers." Compare bar charts such as the ones used in this experiment with ones that include text blocks that interpret the data. What sort of effect does that have on reader comprehension and on the readers' perceived understanding of the graphic?

-- Replication. A study might be done using the same format and the same types of graphics and sidebar as this one used but with different subject matter and a more diverse group of people. Is the sidebar story always more effective?

-- Effectiveness of sidebars. One trend in newspapers today is the shortening of stories and the use of more sidebars. In this case the sidebar was effective. What about longer sidebars? What about sidebars that contain no numerical information? Is a long story less effective than a shorter story and a sidebar?

-- Use of focus groups. Some of the students who participated in this study provided valuable information after the study was complete, often verifying observations the researcher had made. Future researchers might use focus groups that would contain at least one person from each of the sample groups in the experiment. The participants could be asked to tell how they went about reading the story and graphic, what they liked or disliked, what confused them, what helped them, and how they would change the story or graphic to make the information easier to understand.

Although the results from this experiment can't be applied to everyone, some generalizations about some groups can be made. For instance, the information from this study might be useful in applying to the occasional reader, the category that seems to fit most of the students who participated in the experiment. Certainly, the results should apply to others of similar age and education, a group that increasingly has turned away from newspapers and news in general.

Obviously the roots of attracting non-readers or occasional readers run deeper than the ability to understand a single graphic and story. But the results here might point to at least one problem. If subjects in this study perceived a single graphic and story as too difficult to comprehend, they might have similar perceptions with similar stories and graphics, and perhaps an entire newspaper. That observation might reach too far, but the last thing editors need to do is give potential readers another excuse not to read.

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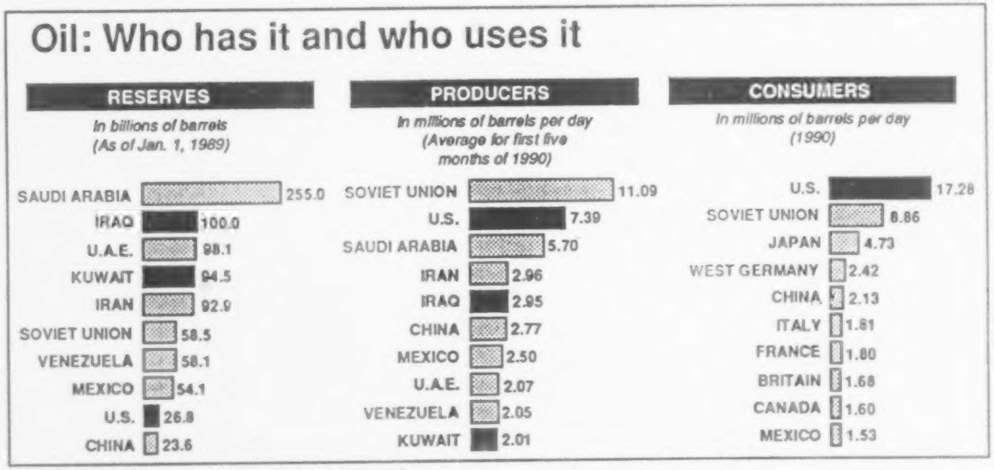
APPENDIX I

Samples of stories and graphics used in experiment

(Note: All versions have been reduced
to 91 percent of originals.)

Grab for power upsets fragile order

By Marc Duvoisin
The Philadelphia Inquirer



SOURCE: U.S. Department of Energy, Oil and Gas Journal

With his lightning invasion of Kuwait, Iraqi President Saddam Hussein has rewritten the map of the Middle East, firmly established himself as the dominant Arab leader and shattered the political status quo in a region of enormous strategic importance to the United States.

Oil prices have shot up and stocks have plunged since the news that Iraqi armored columns all but devoured the tiny desert sheikdom Aug. 2, seizing the capital and driving the ruler into exile. But the effects are not likely to end there.

Saddam now controls 20 percent of the world's oil reserves. That and the fear engendered by his conquest of Kuwait will make it difficult for other OPEC members to resist his efforts to curb production and push up prices. Some analysts say that the surge in oil prices since the invasion could help tip the sluggish U.S. economy into recession.

"It's a global economic crisis," said Judith Kipper, a Middle East specialist at the Brookings Institution in Washington. "This was a war of resources for, first, money; second, oil, and third, power - capacity to influence oil policy, production and prices."

Iraq's invasion of Kuwait is the most iron-fisted of a series of actions it has taken against the emirate since Kuwait became independent in 1961.

The roots of the dispute are buried in a time when tribal rivalries flowed across the desert, but the animosity can be directly traced to the defeat of the Ottoman Empire in World War I, when Iraq was a Turkish territory and Kuwait was a British protectorate.

It was then, under the Treaty of Uqayr, that the victorious British halved Kuwait, leaving 7,000 square miles of mostly arid, undulating land at the northwest end of the Persian Gulf to constitute the modern country of Kuwait, and divided the remaining half between the Saudis and the Iraqis.

"You see, the borders were arbitrary to begin with," said Leonard Firestone, a Middle East expert and professor of political science at Hofstra University on Long Island, N.Y. "They were established by the West after World War I, so it was almost an invitation to conflict."

Kuwait's vast oil reserves weren't discovered until the 1930s and weren't developed until after World War II. Those reserves are now estimated to be the fourth largest in the world, behind Saudi Arabia, Iraq and the United Arab Emirates.

Analysts said a dispute over pricing of that oil, coupled with Iraq's economic problems, played a large

(Continued on next page)

Version 1

Grab for power upsets fragile order

(Continued from previous page)

part in Saddam's decision to invade. Iraq emerged from its eight-year war with Iran deeply indebted to Western banks and Arab governments. Desperate for cash, Saddam wanted other OPEC members to increase prices. He accused Kuwait and the United Arab Emirates of wrecking his economy by exceeding their OPEC production quotas and keeping prices down.

Before the invasion, Iraq had been suffering from 45 percent inflation and frequent food shortages. Kuwait, with oil reserves estimated at 94.5 billion barrels, proved an irresistible target. Firestone likened the invasion to "robbing a bank."

The countries near Iraq had been concerned about just such a move. After the Iran-Iraq war broke out in 1980, Kuwait, Saudi Arabia, Qatar, Bahrain, Oman and the United Arab Emirates established a regional alliance to promote cooperation in economic and security matters. Known as the Gulf Cooperation Council, the alliance was aimed in part at deterring Iraq from further aggression.

August's invasion underscored the flimsiness of the alliance. Saudi Arabia, which possesses billions of dollars worth of U.S.-made military hardware, did not lift a finger to halt Iraq's advance into Kuwait. Most other Arab governments kept an embarrassed silence until a few days later, when the Arab League condemned the action.

Among the casualties of the Iraqi thrust was the unwritten agreement that had kept the peace among Arab states for more than two decades.

After the 1967 Six-Day War, when Israel defeated the armies of six Arab countries, Egyptian President Gamal Abdel Nasser settled a longstanding feud with the Saudi royal family so the Arab world could present a united front in future battles with Israel.

Since then, secular, progressive regimes such as those in Syria and Egypt have remained on amicable terms with the conservative monarchies. Different states have fought each other indirectly, often using Palestinian guerrillas as proxies. But until August, there had been no direct military confrontations since Egypt and Libya fought a brief border war in 1977.

Subsidies from the oil states played an important role in keeping the peace. Loans and grants from the gulf states helped Egypt feed its people and bankrolled the Syrian military presence in Lebanon. But relations have grown strained in recent years as oil revenues have plunged and inter-Arab aid has declined.

"So long as this system worked, there was a sort of interesting balance of power," said Yahya Sadowski, a research associate at the Brookings Institution. "Saddam has, with one sharp blow, utterly destroyed that system, and it's terrifying, not only for the Kuwaitis and Saudis, but for all Arab governments."

Iraq's territorial designs on Kuwait go back a long way. For centuries, the emirate was part of the Ottoman province of Basra, in what is now southern Iraq. In 1898, Britain established a separate protectorate of Kuwait. Iraq never accepted the new boundary. Plans for an invasion were first drafted under the British-backed Hashemite monarchy, which ruled Iraq until 1958.

In 1961, the British granted independence to Kuwait. But Iraq, asserting that the protectorate had been an integral part of Basra Province under the Ottoman Empire, refused to recognize the nation and massed troops. When Britain sent troops, Iraq retreated.

The border dispute was never settled, and twice, in 1967 and again in 1973, Iraq occupied small areas of northern Kuwait.

During its war with Iran, Iraq kept silent about the dispute because it needed Kuwait's financial support.

"It's my understanding that Kuwait and Saudi Arabia loaned Iraq about $65 billion, at least half of the money coming from Kuwait," Firestone said. "The Kuwaitis were hoping that the aid would make Iraq relinquish any claim. Obviously, that wasn't what Saddam Hussein had in mind." ∎

Grab for power upsets fragile order

By Marc Duvoisin
The Philadelphia Inquirer

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Oil: Who has it and who uses it

RESERVES		PRODUCERS		CONSUMERS	
In billions of barrels (As of Jan. 1, 1989)		*In millions of barrels per day (Average for first five months of 1990)*		*In millions of barrels per day (1990)*	
SAUDI ARABIA	255.0	SOVIET UNION	11.09	U.S.	17.28
IRAQ	100.0	U.S.	7.39	SOVIET UNION	8.86
U.A.E.	98.1	SAUDI ARABIA	5.70	JAPAN	4.73
KUWAIT	94.5	IRAN	2.96	WEST GERMANY	2.42
IRAN	92.9	IRAQ	2.95	CHINA	2.13
SOVIET UNION	58.5	CHINA	2.77	ITALY	1.81
VENEZUELA	58.1	MEXICO	2.50	FRANCE	1.80
MEXICO	54.1	U.A.E.	2.07	BRITAIN	1.68
U.S.	26.8	VENEZUELA	2.05	CANADA	1.60
CHINA	23.6	KUWAIT	2.01	MEXICO	1.53

SOURCE: U.S. Department of Energy, Oil and Gas Journal

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Analysts said a dispute over pricing of that oil, coupled with Iraq's economic problems, played a large

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Version 2

Grab for power upsets fragile order

By Marc Duvoisin
The Philadelphia Inquirer

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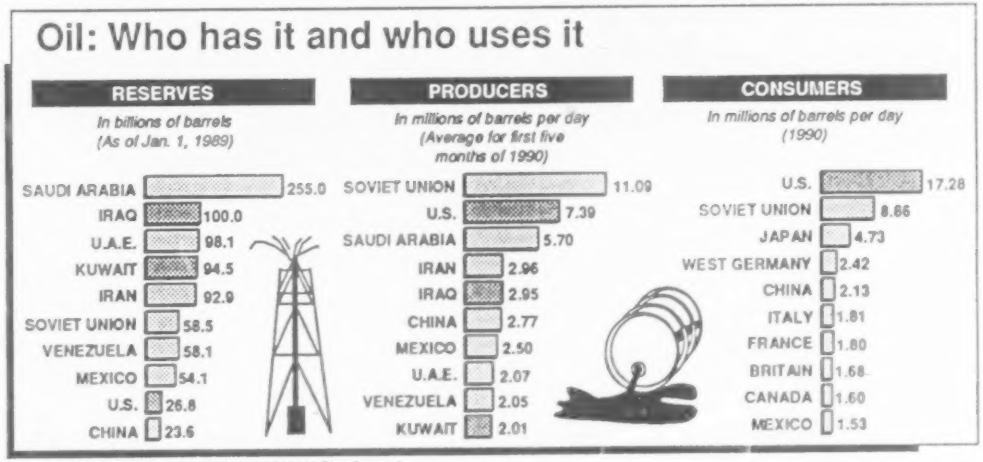
Oil prices have shot up and stocks have plunged since the news that Iraqi armored columns all but devoured the tiny desert sheikdom Aug. 2, seizing the capital and driving the ruler into exile. But the effects are not likely to end there.

Saddam now controls 20 percent of the world's oil reserves. That and the fear engendered by his conquest of Kuwait will make it difficult for other OPEC members to resist his efforts to curb production and push up prices. Some analysts say that the surge in oil prices since the invasion could help tip the sluggish U.S. economy into recession.

"It's a global economic crisis," said Judith Kipper, a Middle East specialist at the Brookings Institution in Washington. "This was a war of resources for, first, money; second, oil, and third, power - capacity to influence oil policy, production and prices."



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Oil: Who has it and who uses it

Saudi Arabia has the world's largest oil reserves, according to the U.S. Department of Energy and the industry magazine Oil and Gas Journal. The Saudis' reserves of 255 billion barrels are more than 2 1/2 times those of Iraq, whose reserves of 100 billion barrels are the second largest in the world.

The United Arab Emirates has the third largest oil reserves (98.1 billion barrels), and is followed by Kuwait (94.5), Iran (92.9), the Soviet Union (58.5), Venezuela (58.1), Mexico (54.1), the United States (26.8) and China (23.6).

The Soviet Union is the world's largest oil producer. During the first five months of this year, the Soviets produced an average of 11.09 million barrels of oil per day.

During that same time, the United States was the second largest producer, averaging 7.39 million barrels.

The United States was followed by Saudi Arabia (5.7 million barrels per day), Iran (2.96), Iraq (2.95), China (2.77), Mexico (2.5), the United Arab Emirates (2.07), Venezuela (2.05) and Kuwait (2.01).

The United States far exceeds any other country in consuming oil. So far this year, the United States has used an average of 17.28 million barrels of oil each day.

The Soviet Union, which has used an average of 8.86 million barrels of oil per day this year, is the second largest oil consumer.

The Soviets are followed by Japan (4.73 million barrels of oil per day), West Germany (2.42), China (2.13), Italy (1.81), France (1.8), Britain (1.68), Canada (1.6) and Mexico (1.53).

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Analysts said a dispute over pricing of that oil, coupled with Iraq's economic problems, played a large part in Saddam's decision to invade. Iraq emerged from its eight-year war with Iran deeply indebted to Western banks and Arab governments. Desperate for cash, Saddam wanted other OPEC members to increase prices. He accused Kuwait and the United Arab Emirates of wrecking his economy by exceeding their OPEC production quotas and keeping prices down.

Before the invasion, Iraq had been suffering from 45 percent inflation and frequent food shortages. Kuwait, with oil reserves estimated at 94.5 billion barrels, proved an irresistible target. Firestone likened the invasion to "robbing a bank."

The countries near Iraq had been concerned about just such a move. After the Iran-Iraq war broke out in 1980, Kuwait, Saudi Arabia, Qatar, Bahrain, Oman and the United Arab Emirates established a regional alliance to promote cooperation in economic and security matters. Known as the Gulf Cooperation Council, the alliance was aimed in part at deterring Iraq from further aggression.

August's invasion underscored the flimsiness of the alliance. Saudi Arabia, which possesses billions of dollars worth of U.S.-made military hardware, did not lift a finger to halt Iraq's advance into Kuwait. Most other Arab governments kept an embarrassed silence until a few days later, when the Arab League condemned the action.

Among the casualties of the Iraqi thrust was the unwritten agreement that had kept the peace among Arab states for more than two decades.

After the 1967 Six-Day War, when Israel defeated the armies of six Arab countries, Egyptian President Gamal Abdel Nasser settled a longstanding feud with the Saudi royal family so the Arab world could present a united front in future battles with Israel.

Since then, secular, progressive regimes such as those in Syria and Egypt have remained on amicable terms with the conservative monarchies. Different states have fought each other indirectly, often

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Version 5

Grab for power upsets fragile order

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using Palestinian guerrillas as proxies. But until August, there had been no direct military confrontations since Egypt and Libya fought a brief border war in 1977.

Subsidies from the oil states played an important role in keeping the peace. Loans and grants from the gulf states helped Egypt feed its people and bankrolled the Syrian military presence in Lebanon. But relations have grown strained in recent years as oil revenues have plunged and inter-Arab aid has declined.

"So long as this system worked, there was a sort of interesting balance of power," said Yahya Sadowski, a research associate at the Brookings Institution. "Saddam has, with one sharp blow, utterly destroyed that system, and it's terrifying, not only for the Kuwaitis and Saudis, but for all Arab governments."

Iraq's territorial designs on Kuwait go back a long way. For centuries, the emirate was part of the Ottoman province of Basra, in what is now southern Iraq. In 1898, Britain established a separate protectorate of Kuwait. Iraq never accepted the new boundary. Plans for an invasion were first drafted under the British-backed Hashemite monarchy, which ruled Iraq until 1958.

In 1961, the British granted independence to Kuwait. But Iraq, asserting that the protectorate had been an integral part of Basra Province under the Ottoman Empire, refused to recognize the nation and massed troops. When Britain sent troops, Iraq retreated.

The border dispute was never settled, and twice, in 1967 and again in 1973, Iraq occupied small areas of northern Kuwait.

During its war with Iran, Iraq kept silent about the dispute because it needed Kuwait's financial support.

"It's my understanding that Kuwait and Saudi Arabia loaned Iraq about $65 billion, at least half of the money coming from Kuwait," Firestone said. "The Kuwaitis were hoping that the aid would make Iraq relinquish any claim. Obviously, that wasn't what Saddam Hussein had in mind." ■

The Application of Publication
to New Information
Transfer Technologies

Elizabeth K. Viall

University of Alabama

RUNNING HEAD: Publication

If Ernest Hemingway had written one of his "Great American Novels" today, it might have been typed on a Macintosh using Microsoft Word instead of an old Royal typewriter.

Instead of visiting with friends and exchanging ideas verbally, the novelist might have sent bits and pieces of his novel to colleagues and friends by electronic bulletin board. And that work, of course, -that original expression ,is protected by copyright.

If, a few months later, large sections of Hemingway's book wind up in a magazine article criticizing Hemingway and his work, the author can sue for infringement.

But will he win?

Is the use of the material fair? Have those words been published even if they've never been on a piece of paper? What if that great American novel begins, and ends, on a computer screen. Can something transmitted thousands of miles still be considered unpublished?

Law lags behind technology. Nowhere is this more apparent than in copyright law. Communication no longer requires paper, pen and postman as ideas and expressions travel by satellite and fiber optics. In some cases, machines communicate with machines.

Copyright law is based on print technology. With the advent of the printing press, there was a need to protect authors from infringement of their works. Protection for unpublished pieces of work was absolute. They were also easily identified. Printing -- per se -- was the only means of disseminating the works. Establishing "publication," then, was a simple process.

Today, however, news is printed -- but only after being transferred over a "wire." Reporters send stories via phone lines from far away locations. Videotape footage is sent by satellite. Businesses communicate by using computer hook-ups. The concept of unpublished or published works is not as simple as it once was.

This paper traces case law on unpublished works and other sources marking the publication line in United States Copyright law. Twenty-five cases spanning a period of 1904 to 1990 were reviewed for this paper. The principles echoing the publication line in U.S. law are then applied to new technology uses such as electronic mail and bulletin boards, facsimile machines and raw videotape. Clearly, case law predicts materials transmitted by these new technologies can be labeled "unpublished."

The concept of unpublished works traditionally has been inherent in common law copyright. The 1909 Copyright Act provided authors of unpublished works with the absolute right of first publication of their work. No one but the author had the right to publish the work. But once a work was published, then statutory copyright protection took over. And in order to obtain this statutory protection, the copyright notice had to be affixed to the work upon publication. Otherwise, the work entered the "public domain" and the author had no remaining copyright protection. Courts continue to wrestle with cases which follow the 1909 Act. Kramer v. Newman (1990) was one of these. Here the court was considering infringement of unpublished materials of James Agee which fell under common law copyright. "The publication divests the owner of his common law copyright and since he has not affixed the proper notice, he has not secured statutory protection...The work enters the public domain" (Kramer v. Newman, 1990, p. 548, 549).

Under the 1909 Act, the line between common law and statutory copyright protection was drawn by the concept of publication. Unpublished works were granted copyright protection perpetually as long as publication did not occur.

The 1976 Copyright Act, however, changed things. Publication was no longer the boundry between two different kinds of copyright protection. Both unpublished and published works were protected by statutory copyright law.

The definition of publication, or perhaps, its non-definition, has been one of the many factors of copyright with which courts have periodically attempted to deal. Prior to 1976, if a work was published without copyright notice, an infringer could show loss of copyright. Today, the definition is continually being refined as courts have given more protection to unpublished works in copyright cases. However, defining publication in the last few decades has not been an easy task as courts have wrestled with a term (publication) created in the age of print (de Sola Pool, 1983) and have faced cases in an age of changing technology (Georgia Television v. TV Newsclips of Atlanta). Today, technology sprints on while the courts are still grappling with the consolidation of common and statutory law in copyright (Love v. Kwitny, 1989).

Defining "Publication"

There is a substantial lack of a modern definition of the publication term in U.S. Code. U.S. courts have, however, adopted Nimmer's rule -- a conglomeration of much case law -- which states that "publication occurs when by the consent of the copyright owner, the original or tangible copies of a work are sold, leased, loaned, given away, or otherwise made available to the general public, or when an authorized offer is made to dispose of the work in any such manner even if a sale or other such disposition does infact [sic] not occur." (Nimmer, 1985, 3, p. 4-19).

Since unpublished works were granted protection perpetually under the 1909 Act (1985), the concept of publication was an important one. A work was published when it went out to the people. Actual "publication," however, did not occur when only a few people viewed the work. Under common law, unpublished works are apparently not compromised when viewed by a limited number of people.

> A limited publication which communicates the contents of a manuscript to a definitely selected group and for a limited purpose, and without the right of diffusion, reproduction, distribution or sale, is considered a 'limited publication' which does not result in loss of the author's common law right to his manuscript. (King v. Mister Maestro, Inc., 1963, p. 101)

According to Nimmer (1985), a limited publication could be defined as a distribution of copies by an author to a circle of immediate friends with the understanding that the copies will not be circulated or duplicated; or as the distribution of copies by an author to people in his trade for limited purposes of review, criticism or performance.

To be a limited publication, the court noted in White v. Kimmell (1952) that circulation of a work needed to be restricted in the sense of both people and purpose. In Burke v. National Broadcasting Company (1979), the First Circuit determined that those restrictions could be either implied or explicit. Here the court found that a photographer did not explicitly state that copies of his film could not be distributed to others "but we think such limitations are reasonably to be implied: Dr. Grzimek made a specific request to use the film for a specific purpose, and Dr. Burke's affirmative response cannot be thought to have authorized any further use or other purpose" (p. 693). The consent for use, the court found, was to one person who had a specific limited purpose and Grzimek had "no reason to suppose that he was free to distribute copies of the film at will, or to license its commercial use" (p. 694).

In addition, at common law the performance or exhibition of a work is not construed as publication.

> Public exhibition is not necessarily a general publication merely because the public generally is shown the work. The test of general publication is whether the exhibition of the work to the public is under such conditions as to show dedication without reservation of rights or only the right to view or inspect it without more...If the conditions of publication are such that the only right is to look at the copy of the work exhibited, there is no general publication. (Patterson v. Century Productions, Inc., 1937, p. 492)

Courts have found limited publication where the range and purpose of distribution of the work did not suggest that the general public was free to obtain and use the work (Patterson v. Century Productions, 1937).

Courts have also, in some instances, defined publication using the term dissemination. The Supreme Court stated in American Tobacco Co. v. Werckmeister (1907) that general dissemination is a dissemination of a work of art itself among the public, as to justify the belief that it "took place with the intention of rendering the work common property" (p. 299).

Section 101 of the 1976 Act (1985) also defines publication as:

> The distribution of copies or phonorecords of a work to the public by sale or other transfer of ownership, or by rental, lease, or lending. The offering to distribute copies or phonorecords to a group of persons for purposes of further distribution, public performance or public display constitutes publication. A public performance, or public display, of a work does not of itself constitute publication.(Title 17, Copyrights, chap. 1 § 101)

According to the legislature (House Report No. 1476, 1976, Sec. 202, App 4-93) this means that distribution to the public is generally to persons under no explicit or implicit restrictions with respect to disclosure of its contents -- suggesting that the general public was free to obtain and use the work (Patterson v. Century Productions, Inc., 1938). Any form of dissemination in which a material object does not change hands -- performances or displays on television included -- is not a publication no matter how many people are exposed to the work (House Report 1476, 1985). Speeches are not considered published when given to large groups of people, when text is given to the press and excerpts broadcast on television (King v. Mister Maestro, Inc., 1963). Such uses as educational use of materials were codified as fair use under the 1976 Act.

If members of the public were free to copy a work on exhibit, then publication may occur but a prohibition against copying can be "tacitly understood" or implied (American Tobacco v. Werckmeister, 1907). Such a prohibition might be restrictions imposed by a gallery which allows no pictures or sketches to be made (Werckmeister v. American Lithographic Company, 1904).

This line of reasoning has been demonstrated in a hardline attitude among United States' courts toward unpublished materials. In Salinger v. Random House, Inc. (1987), a case about the use of J.D. Salinger's unpublished letters, the Second Circuit quoted Nimmer in that the copyright owner owns the literary property rights, including the right to complain of infringing copying, while the recipient of the letter retains ownership of "the tangible physical property of the letter itself" (Nimmer, 1985, §5.04, 5-32). "The recipient having ownership, the court noted, can deposit the letter with a library..." (Salinger v. Random House, Inc., 1987).

Such a deposit, then, does not constitute publication since it was not released by the author for public consumption. In the case of Salinger v. Random House, Inc. (1987) the letters were not viewed by the general public and the libraries had forms specifying restrictions which viewers had to sign. Also, in Kramer v. Newman (1990) the materials in question were at a university research center and were not "'available on demand to members of the public'" (p. 547).

According to the 1976 Copyright Act (1982):

> Ownership of a copyright, or of any exclusive rights under a copyright, is distinct from ownership of any material object in which the work is embodied. Transfer of ownership of any material object, including the copy or phonorecord in which the work is first fixed, does not of itself convey any rights in the copyrighted work embodied in the object. (Title 17, Copyrights, chap. 1 § 202)

Nor is the deposit of the work with the Copyright Office a publication. The registration is open for public inspection and is on view during the term of copyright. "The prevailing rule is that deposit of a copy of an unpublished work with the Copyright Office in order to obtain a statutory copyright is not a publication even though done voluntarily to obtain statutory rights" (Zachary v. Western Publishing, 1978, p.42). The court noted that publication did also not occur when works were produced under subpoena for court actions and were then in court record and available for public inspection.

Deposits of a work in other instances -- with government agencies, for instance, to comply with building regulations, also do not constitute publication (Zachary, 1978). Deposits of documents do not negate copyright protection and in some cases have been found to in fringe it. In Association of American Medical Colleges v. Carey (1990), the court found that a New York State law requiring deposit of the MCAT test which also allowed public disclosure of the document was an infringement of federal copyright protection.

Unpublished Works

Unpublished works, then, seem to be works which the author or copyright owner has not disclosed to the public or not intended to disclose to the public. Courts have ruled that the sale of one copy of a work constitutes publication since this shows the availability for public sale (Bobbs-Merrill Co. v. Straus, 1906). The sale of one copy, if done with the author's consent, shows intent to let the public acquire the work. "Such statements express the thought that the availability for public sale constitutes publication even if sales are minimal" (Roy Export v. Columbia Broadcasting System, 1982, p. 672). Here, the court noted that while there might be limitations on the delivery of the copies of a work, the delivery still might insure that the public or "an indefinite portion of it" would have access to the work. Therefore, if the author consents to such a distribution where the public would have access to copies of the work, publication has taken place.

Just because Salinger's letters had been somewhat disseminated should not conclude that the letters' contents had been disclosed to the public. The letters could have been viewed by the public, bringing on a de facto publication, but, the court points out in Harper & Row v. Nation (1985), such dissemination must have been authorized by the copyright owner.

In the recent Love v. Kwitny (1989) case, Kwitny argued that the author (Love) had granted him verbal non-exclusive rights to a paper. However, the court found:

> There was no basis for Love to know...that Kwitny intended to quote a substantial part of his paper in Endless Enemies. Accordingly, Kwitny had no right to believe he had been authorized to quote the paper to the extent he did. (p. 1131, 1132)

Kwitny also argued that the paper was not as unpublished as Salinger's letters but the court responded·that permission to two professors and four others to use the material "cannot be construed as dedicating his paper to wholesale use in the academic or any other community" (p. 1134).

The court's intentions clearly lead to this conclusion as illustrated in another case. A letter to the editor sent to a newspaper in Diamond v. Am-Law Publishing Corporation (1984) showed the author's intent that the work be disseminated to the public.

All of this language in court cases points to the basic concept of unpublished works in common-law copyright - that the author has the right of first publication of his work. This is clearly the intention of the courts, even under the 1976 Act, when they make use of words such as "authorization" and "intent" when speaking of publication. The emphasis on control of first publication leads to the economic roots of U.S. copyright law. The author or copyright holder must be able to preserve:

> The pecuniary value of his work and the identification of his name with the work. This

> latter interest encompasses both the particular form in which his ideas are given expression and the very ideas and themes themselves. The author seeks to protect his creative thoughts, now in tangible form, until those thoughts are sufficiently developed for public scrutiny. (Dana, 1977, p. 366)

This is stated specifically, although with an exemption, in Hemingway v. Random House, Inc. (1968) when the court noted:

> Copyright, both common-law and statutory, rests on the assumption that there are forms of expression, limited in kind, to be sure, which should not be divulged to the public without consent of their author. The purpose far from being restrictive, is to encourage and protect intellectual labor. (p. 255)

The Supreme Court notes:

> Creative work is to be encouraged and rewarded, but private motivation must ultimately serve the cause of promoting broad public availability of literature, music, and the other arts. The immediate effect of our copyright law is to secure a fair return for an 'author's' creative labor. But

> the ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good. (Twentieth Century Music Corp. v. Aiken, 1975, p. 156)

The best way to do this for the "general public good" is to provide copyright holders with a limited monopoly (Nimmer, 1979, §3.1,6.6) in order to achieve personal gain (Mazer v. Stein, 1954, p. 219) from their works.

Prepublication is a "critical stage" (Harper & Row v. Nation, 1985, p. 555) of a work through which an author should retain control. Here, the Appeals Court stated that the potential damage of sharing first publication is substantial. The author is robbed of his right to publish where he will and in what form he will. Then again, if only portions of a work are published the author may have his work misinterpreted. "In its commercial guise...an author's right to choose when he will publish is no less deserving of protection. The period including the work's initiation, its preparation, and its grooming for public dissemination is a crucial one for any literary endeavor" (105 S.Ct., p. 2228).

Justice O'Connor argues in Harper & Row v. Nation (1985) that the unauthorized copying of an unpublished material would probably have a large impact on economic values of the copyright in that work. This is also one of the four factors raised in issues of fair use - effect on the market. In Harper & Row v. Nation (1985), the court describes the 300 words of President Ford's memoirs as the "heart" of the book. This could have an effect on the potential market for the book, the court determined. Thus, its publication would undermine the concept that an author should be allowed to gain from his work.

Also, in Salinger v. Random House (1987) the Second Circuit noted that -- reading Hamilton's biography -- "for at least some appreciable number of persons, these phrases will convey the impression that they have read Salinger's words...so as to diminish interest in purchasing the originals" (p. 99).

The Right Not to Speak

Another implied authority is behind the author's right to first publication.

> The essential thrust of the First Amendment is to prohibit improper restraints on the voluntary

> public expression of ideas; it shields the man who wants to speak or publish when others wish him to be quiet. There is necessarily, and within suitably defined areas, a concomitant freedom not to speak publicly, one which serves the same ultimate end as freedom of speech in its affirmative aspect. (Hemingway v. Random House, 1968, p. 255)

In Wooley v. Maynard (1977), Chief Justice Burger reiterated that freedom of thought and expression "includes both the right to speak freely and the right to refrain from speaking at all" (p. 714). Harper & Row v. Nation (1985) echoed the same thoughts.

Threads running through Hemingway v. Random House (1968) and Wooley v. Maynard (1977) echo a much older case which also indicated that authors have the right not to speak. The courts had earlier gone so far in Baker v. Libbie (1912) as to agree that an author can bar publication of his unpublished letters.

> The right of the author to publish or suppress publication of his correspondence is absolute in the absence of special circumstances, and is independent of any desire or intent at the time of writing. It is an interest in the intangible and

> impalpable thought and the particular verbal garments in which it has been clothed. (97 N.E., p. 111)

This concept reappears in the landmark Salinger v. Random House, Inc. (1987) case where the District Court noted the author may "bar unauthorized publication of his unpublished work, even if it is his hope to keep it from being published forever" (p. 423). The right not to publish, then, is just as important as the one to publish and although several courts imply that the public interest may at some point outweigh that intent not to publish (Baker v. Libbie, 1912; New Era v. Hold, 1989) no cases have clearly shown that the public interest alone would allow fair use of an unpublished work. "This court has been unable to find any case in which the U.S. Supreme Court, or indeed any other federal court, has invalidated an section of the Copyright Act on First Amendment grounds" (Hearst Corp. v. Stark, 1986, p. 977).

This continued in New Era v. Holt (1988) when the district court delineated:

> [The] principal reason for the difference between published and unpublished works is that for works

> that have not yet been published, the copyright owner's interests may be affected by choices as to the manner and context of the first public revelation of the work, including the choice whether it should be published at all. (p. 1500).

The District Court again expressed this choice or decision to publish in New Era v. Carol Publishing (1990).

Less Fair Use Leeway

Although the 1976 Act put both published and unpublished works on the same footing -- making both liable to an infringement defense of fair use -- the courts have continued to give infringers of unpublished works less leeway. Concerns of first publication and the right to speak -- or not to speak -- have been given emphasis in these cases. Therefore, the nature of the work -- its unpublished nature -- still makes a difference and still marks a line in copyright law.

The result of New Era v. Holt (1989) and Salinger v. Random House (1987) has been greater protection for the author of an unpublished work to speak or not speak. Chief Justice Miner noted in New Era v. Holt that the Harper & Row v. Nation decision recognized that the right not to publish is a most important one. Writing for the majority he stated, "It can now be said that fair use is never to be liberally applied to unpublished copyrighted material, even if the work is of such high public concern as the memoirs of President Ford" (p. 661). Indeed, "Where use is made of materials of an 'unpublished nature,' the second fair use factor has yet to be applied in favor of an infringer" (New Era v. Holt, 1989, p. 583).

Prior to New Era v. Holt (1989), the Second Circuit quoted Harper & Row v. Nation (1985) in its Salinger v. Random House (1987) case and noted the fact that a work is unpublished is a critical element of its nature.

> Public awareness of the expressive content of the letters will have to await either Salinger's decision to publish or the expiration of his copyright, save for such special circumstances as might fall within the 'narrower' scope of fair use available for unpublished works.(p. 100)

Harper & Row v. Nation (1985) noted that Congress intended the unpublished nature of a work to be a major factor in considering fair use. The court noted that Congress intended for the applicability of fair use to unpublished works to be limited since it is a deliberate choice by the copyright holder to keep the work from being published (p. 553). Also, the same general standard was intended for all kinds of uses of copyrighted material (p. 554). "We conclude that the unpublished nature of a work is a key though not necessarily determinative factor tending to negate a defense of fair use" (p. 554).

What is significant here is that unpublished works have been interpreted by the courts as having a large impact on the four-factor fair use criteria which they use in determining any defense of infringement. Therefore, determining whether a work has actually been published or remains in the unpublished category is a factor which needs to be considered since courts have been quite strict in their dealings with unauthorized use of unpublished materials.

In fact, the narrowness of the allowable fair use of unpublished materials was noted and applied in 1990 (Association of American Medical Colleges v. Carey, 1990) when the court discussed the New Era v. Holt (1989) case.

> The decision can properly be read as instructing district courts to give a little extra regard to an 'important' use - even one of great public benefit - beyond that given a work of 'ordinary' comment and criticism. Moreover, absent extraordinary circumstance, works unpublished in nature are to receive complete copyright protection. While these narrow rules would appear inconsistent with the equitable nature of the fair use analysis, this court is bound to follow them. (p. 883)

This recent case found it "would be hard pressed to provide an example of an 'unpublished' work which more deeply affects the lives and careers of individuals" (p, 885) but still determined that the MCAT had not been published through administration of the exam. The unpublished nature of the work cut in favor of the plaintiff despite the public interest.

Protection by Copyright

While courts are struggling to get a handle on the publication concept, especially in light of new technology, the notion of copyright is a bit more amenable to the new changes in information transfer. Copyright was developed to protect a multitude of materials. Copyright, in the United States, protects intellectual property -- original expression but not ideas or facts. The Act of 1909 listed specific works which can be protected under common-law and statutory copyright. They included books, cyclopedic works, directories, gazetteers, compilations, periodicals including newspapers, lectures, sermons, addresses, dramatic or dramatic-musical compositions, musical compositions, maps, works of art, reproductions of works of art, drawings or works of a scientific or technical character, photographs, prints or illustrations, motion pictures and sound records (Sec. 102, App. 6-5). It also included "all writings of an author" (Sec. 102, App. 6-5).

Protection in the 1976 Act was extended to works of authorship in the fields of literary works; musical works including accompanying words; dramatic works including accompanying music; pantomime and choreographic works; pictorial, graphic and sculptural works; motion pictures and other audiovisual works; and sound recordings (Sec. 102, App. 4-10, 11, 12).

The new act took into consideration technology of the 20th century and fast-approaching 21st. It lists seven categories which are considered general. There is flexibility, the House Judiciary Committee emphasized, "to free the courts from rigid or outmoded concepts of the scope of particular categories" (House Report No. 1476, 1976, Sec. 102, App. 4-12).

Stretching Copyright Past the Printing Press

But today, copyrightable materials are jumping into even more new forms with the help of technology. This was recognized with the passage of the Software Copyright Act in 1980 which focused on computer software (Holder, 1983). Since then there have been advances in the form of telecommunications and electronic mail (Holder, 1983).

Meanwhile, new technology also meant new forms of copyrightable materials which may need to be classified as published or unpublished. Court decisions made since 1976 -- especially Harper & Row v. Nation (1985), Salinger v. Random House (1987), and New Era v. Holt (1988) -- have placed unpublished works in a protected category. The fact that the works were unpublished was a critical element as the courts decided fair use was not a defense for infringement. Since courts have delineated that a work's unpublished status is a critical element, they may soon have to decide if materials produced by new technological means are also "unpublished." Using the only criteria courts have today -- court definitions and court interpretations of legislative reports -- courts may tip the scales toward the "unpublished" spectrum when it comes to many of the works being transferred by new technological methods.

For instance, using court decisions, electronic mail or computer bulletin board expressions would be construed to be unpublished. Electronic bulletin boards are used for reception and transmission of data from one computer system to another (Cangialosi, 1989). They are both message centers and software libraries -- message centers where people within a group, association or with a similar interest can learn about their field; libraries where those researching a specific topic can find specific information. Electronic bulletin boards are disseminated to a limited audience -- members of the bulletin board subscription service -- and are not usually intended to be disseminated to the general public. There is no intent to render the work "common property" (American Tobacco Company v. Werckmeister, 1907, p. 300). Indeed, the work seems to be restricted in both audience and purpose. In purpose, most bulletin boards seem to have common topic areas of common interest to subscribers with the purpose of trading information and opinions with other subscriber experts in that area. This would not constitute publication if it did not suggest the general public was free to use the work (Burke v. National Broadcasting Company, 1979).

The same could be said for electronic mail. Such messages are often sent via computer and phone line to a limited number of people. Just as with the Postal Service, letters transferred by computer and phone line are mostly sent to specific persons. This is analogous to Salinger v. Random House (1987) and would be treated the same by the courts. An infringer would have to show an author's intent or actions resulting in general publication rather than one where copies go to a selected group of people for a limited purpose (Burke v. National Broadcasting Company, 1979).

Raw videotape footage would also be categorized as unpublished works under most circumstances. Copies might be made for editing, especially in the case of a news program, however, these would not be intended for general distribution to the public. For publication to occur, the footage would have to be offered to the public for sale or to an intermediary with the intent to sell or have the tape distributed (17 U.S.C., Sec. 101; Nimmer, 1985; Bobbs-Merrill Company v. Straus, 1908).

News programmers would make copies for their own archives or for program editing but would have the intention of controlling the on-the-air transmission of the tape. Even transmission is not a publication (Pacific v. Carol Duncan, 1983). Transmission of non-syndicated radio and television programs and live television broadcasts fall within the category of unpublished transmission programs. The live broadcast of a Superbowl game on television, therefore, is not a publication.

And while television stations often sell copies of taped material, the sales are not usually to the general public but to a limited audience (Georgia Television Company v. TV News Clips, 1989).

Facsimile machines are another area where the concept of unpublished works could be applied. Here, images from a printed page are transformed into electronic signals which are sent over telephone lines from one location to another (Allen, 1968, p. 946). A copy of the printed page is created at the receiving location. Cangialosi (1989) estimated there may be as many as four million "fax" machines in use today.

Again, the test here would be if the author by intent or action (Burke v. National Broadcasting Company, 1979) made the work available to the general public without "regard to who they are or what they propose to do with it" (p. 691). Publication might be proved if a fax is sent to all fax machines, with no limitations, and with no restrictions.

The courts have a history of protecting unpublished works when it comes to copyright. The basic principles behind this are economic -- first publication (Harper & Row v. Nation, 1985) -- and also include the freedom to express, or not express, oneself. In addition, prior decisions such as Salinger v. Random House, Inc. (1987), Love v. Kwinty (1989), and Association of American Medical Colleges v. Carey (1990) show courts bend over backward to assure that authors of unpublished materials obtain the greatest protection possible.

The author's intentions or actions showing intentions to "publish" (Burke v. National Broadcasting Company, 1979) seems to be the dividing line between unpublished and published works in matters of copyright. In that sense -- and with the courts giving authors the benefit of the doubt (Love v. Kwitny, 1989; Burke v. National Broadcasting Company, 1979) -- unpublished works have greater protection under the fair use doctrine.

With precedents such as these, communications sent via new technological means such as fax, electronic bulletin board or mail, or videotape footage, would also seem categorized as unpublished, in most cases. Use of such materials, then, would be less likely determined "fair use" by the courts in copyright infringement cases.

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ASSESSING THE IMPACT OF MICROCOMPUTERS ON MAGAZINE DESIGN

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> *In July 1990 when Lisa Bowser became art director of* Kansas City Live! *she had no computer skills at all. Two months later she produced an entire 72-page magazine by herself on computer.*
>
> *After ten months she now has more of a grip on the process, but her operation continues to show signs of computer lag. Because her graphic hand skills are so well developed, she still can do certain jobs much faster by hand than on the computer. And because of the computer's capabilities, she now has responsibility for certain tasks that others used to do for her. Still she likes the Mac IIcx with its 19-inch monitor that occupies much of the space on her cluttered desk.*[1]

In 1986 Philip B. Meggs wrote an article for the Journal of Graphic Design in which he raised the question of whether graphic designers would be thrown into "the dustbin of obsolete professions" by the new computer technology. He polled about two dozen designers around the country for their thoughts on the subject and came up with the following observations.

Although promotional materials claimed that with desktop publishing, anyone could handle design, designers noted that computers offered many options but didn't tell the operator what to do with them. They believed the role of designers would be as important as before, but would change as computer technology radically altered the design process. New jobs would be created, but others would vanish. Already young designers were more open to using the computer as a conceptual tool because so many alternatives could be generated quickly on the screen. And tasks too complex to do by hand could easily be done on computer. Meggs concluded that the new high-tech culture would serve "critical educational and informational needs which require thoughtful graphic design." Instead of worrying about the future, he said, designers had better start gearing up for it.[2]

In the intervening five years things have moved very quickly, markedly so in the field of magazine design. Although there are many more untrained designers out there sitting in front of computer screens, putting together interoffice memos and newsletters, the field of graphic design has hardly waned. This paper is intended to take an accounting of the development and adoption to this point of the microcomputerized, desktop publishing technology for magazines. The critical concerns here are the changes occurring in the design and production, prepress process of magazines, the effects on the people and the systems involved and the effect on design and the design process.

These concerns were raised by designers and observers in the mid-1980s with the emergence of desktop publishing. Jonathan Seybold in 1990 wrote that the prepress industry had gone through four revolutionary waves in this century. the most recent being the shift from proprietary systems to mainstream computerization. In moving through each cycle of change, however, he noted that the industry's entire structure was redefined: "New skills are requred; some old skills are no longer relevant." The publishing industry itself is opened up to new entrants.[3] Concerns about a threat to the positions of art directors, graphic designers and typographers were addressed by Dorothy Spencer (1986); her conclusion was that desktop publishing systems would not displace such positions but would simply ease the way for low-end uses such as in-house bulletins and newsletters.[4]

Others raised issues about the impact of the computer as a design tool. Mary Jones (1985) noted that computerized systems integrated both the judmental and mechanical skills of designers. Computers had the potential, she added, for altering the work process with the objective of going beyond a mimicking of past media, to develop ways to exploit the computer's unique capabilities.[5] Sharon Helmer Poggenpohl

(1985) asserted that "a strong and consistent background in visual fundamentals" was required for creative use of the computer. Otherwise, she said, there is simply "the illusion of performance."[6] Another discussion in 1985 among designers Charles Owens, Roger Remington and Michael Twyman addressed the claim that with the removal of traditional hand skills, layout would be speeded up. The result, however, might be the lack of a "gestation period" for design. They also questioned whether the computer's limits might begin to function as value limits for the user who lacks visual training. Their conclusion argued for the professionalism of the person with well-developed visual sensitivities who would have the understanding and confidence to challenge such "value limits" set by the computer as design tool.[7]

These concerns and tentative conclusions were investigated using two approaches, both involving asking questions directly of editors and art directors of magazines. The first step was to survey 200 magazines about their current use of microcomputers in the processes referred to as "desktop publishing." This term was defined as "the use of microcomputers in many of the prepress operations (such as typesetting, page layout and production of camera-ready copy) involved in publication production." The second step was to conduct in-depth on-site interviews with the art directors of three magazines — from the public relations, trade/association and consumer/newsstand magazine categories — about their operations and their perceptions about the impact on magazine design. This paper is a discussion of responses and their implications from both these efforts.

The General Survey — 200 Magazines

In October 1990 a survey was mailed to 200 magazines chosen randomly from the 1990 edition of the Standard Periodical Directory. The survey was directed specifically to the art directors when such information was available in the directory listing; otherwise, it was sent to editors. The magazines included in the study included consumer, association/trade and corporate internal and external publications and represented five groups of different circulation sizes. These were Group 1 - magazines with a circulation of half a million or more; Group 2 - 100,000 - 499,000; Group 3 - 50,000 -99,999; Group 4 - 20,000 - 49,999; and Group 5 - magazines with circulations below 20,000. A total of 105 responses were returned for a rate of 55.3 percent.

In a "Ten-Minute Questionnaire" editors and art directors were asked about the involvement of desktop publishing in the production of their magazines. Questions concerned what processes computers were used for; how long computers had been in their operations; their use of hardware and software; their expectations for desktop publishing and whether those expectations were realized; the savings in production time by going to desktop; the changes in staff structure and responsibilities resulting from desktop; the impact of desktop on the process of production and the design of their publications.

Responses showed a heavy saturation of desktop publishing in this selection of magazines. Of those responding, 80 percent said that computers were used in desktop functions on their magazines, including word processing, typesetting, computer generated graphics, page layout, and production of camera-ready copy. Twenty-two respondents said they did not use computers in desktop functions; of those, however, half noted an intent to move into desktop publishing within 12 months. This group included major national magazines such as Forbes (circulation 725,000) and PRINT (circulation 60,000), but also the small trade publication Franchising World (circulation 10,000).

This heavy saturation of desktop is a recent phenomenon. Only one of the magazines had been on desktop for more than five years; 40 percent had used desktop for one to two years. Three-quarters of the magazines were producing more than half their pages on desktop for every issue. Although Macintoshes were slightly favored over IBMs in this group, most magazine operations used a mix of computer systems, including both formats. The IBM was frequently mentioned as the word processor, whereas the Mac was used for layout.

The editors and art directors were asked why they made the move into the new technology and were given these options: more control over final product; money-savings; time-savings; speedier production process; more flexibility; reduced workload. The responses indicated magazines went into desktop primarily with the ideas of saving money and time; the third-ranked reason was to gain more control over the final product. In their comments respondents noted they liked the "ability to see the product on screen before proofing," and the "ability to handle more work." Editor Dianne Blackmore said she expected all of the areas listed to be affected and that she hoped her company would experience the "great progress this system has brought to other companies."

And were their expectations met? The primary responses were that the system saved time and added more flexibility to the process. "Save money" was the third response; undoubtedly because start-up desktop publishing systems are so costly it takes a while to amortize that expense. In their comments, some respondents noted that the idea that desktop would reduce workload was a myth. Several pointed out that their workloads were actually increased, primarily because the time-saving in production opened up more time to do other things. Some seemed to appreciate this fact; others did not.

When asked to estimate the amount of time saved by desktop, they responded somewhere between 20 and 40 percent, with the range between 20 and 29 percent being the most popular choice. Some said this was difficult to estimate since their jobs had changed and the workload now included other tasks.

Desktop publishing has definitely altered the staff structure and responsiblities in design and production of these magazines. Staff responsibilities have been reassigned on more than half of them; positions have been both eliminated and added. Several noted that work previously subcontracted out was now done in-house and that the use of outside vendors had been reduced. "One good person can do the work of four," wrote one art director. Another said, "Colleagues using desktop to a greater degree than I have voiced some frustration at the expectation that they can now be editor, writer, plus designer and keyliner — in effect, increasing their workload."

When asked about the impact of desktop on the process of production, the great majority (83 percent) said it had improved their systems. However, when asked whether desktop had improved the design of their magazines, they answered with more reservation. More than 62 percent said "yes," but the rest hesitated with "No Opinion" or even disagreed.

As desktop publishing systems have become more sophisticated and less prone to operational problems, magazines have moved into them rapidly. The primary expectation that these systems will save significant money has not yet been met; it may take some time to realize this or it may not ever happen at all as prices on hardware and software upgrades climb. The expectation of saving time has been met in general, but the increasing workload due to reorganization of responsiblities has eroded those extra hours, increasing frustration for some. Although there is an overall agreement that production processes are improved by the use of desktop, there is some ambivalence about the effect on design. This subject is addressed at more length in the interviews with the art directors of three magazines in the following section.

The Focused Survey — Three Magazines

The purpose of this part of the research was to look very closely at the operations of three magazines designed and produced using desktop systems. The three magazines chosen were Enterprise, a corporate internal public relations magazine produced in St. Louis, Mo.; Texas Medicine, a trade/association magazine published in Austin, Tex.; and Kansas City Live!, a consumer/newsstand publication in Kansas City, Mo.

The art directors at all three were contacted by phone to insure their interest and cooperation; then they were each sent an extensive questionnaire of 11 pages. This questionnaire asked for information on their computer systems and for their views on the use of computers as a design tool in the creation of magazine layouts. The questionnaire was followed up with an on-site visit to each magazine. All three art directors were extremely cooperative and helpful in this project, and all were very interested in the subject of the integration of computers into their design work. Following are vignettes of all three magazines with discussions of the thoughts and experiences of the art directors.

Enterprise.

Enterprise is published by Southwestern Bell Telephone Company for about 100,000 employees in a five-state area in the Midwest. It runs 40 pages plus cover with color available on every page. One is impressed with the precision of the design, with the hairline rules that frame the pages, with the careful alignment of copy blocks and artwork, and with the generous use of white space (Figure 1, page 27). The magazine has a look of great control in its design, yet the use of color and the style of the artwork give it a feel of informality. It is very easy to read; the type is legibly presented and the copy flows logically and smoothly. It's an attractive magazine, but definitely not in the style of newsstand publications which emphasize more dramatic graphics.

Enterprise has been designed for the past seven years by John Howze, principle designer with Hawthorne/Wolfe, corporate communications consultants in St. Louis — also the headquarters for Southwestern Bell. Although the design is contracted out, the editor of the magazine, James Anderson, is an employee of Southwestern Bell. Howze is a 1979 graduate of Mississippi State University and has been a practicing graphic designer since his graduation. The only training he has with computers is that which he has received on the job at Hawthorne/Wolfe.[8]

The design agency claims to be the first in St. Louis to integrate computers into its operation, a process which was begun about two years ago. This is not surprising to anyone who has visited the agency's office; it has a clean, functional, "designed" feel to it — all high-tech tones of gray, mocha and white with turquoise accents. The agency has made a huge investment in hardware and software and has now reached a peak in its purchasing; their goal now is simply to stay on top of software development.

Enterprise is a quarterly, now produced utilizing a range of desktop applications including typesetting, design and graphics/illustration, pagination, photo scanning and disk conversion. A mix of IBMs and Mac IIci's is used to produce each issue. A typical computer workstation in the office involves a Mac IIci with 8 megabytes of memory and an 80 MG hard drive serving a 20-inch 24-bit color monitor. The agency went into desktop with the expectation that it would save time; the results have been in time-saving, but also in more flexibility, more control over the final product and money-saving. Howze estimates a 40-to-50 percent saving in time.

"Easily the computer has saved us time. It has allowed us to go back to normal hours," says Howze. "Five years ago I easily worked 60-70 hours per week on rush projects. . . . Time crunch periods now [are only] 50-60 hours per week, and those are few and far between."

The production process for Enterprise begins with the editor sending Howze all the copy for the upcoming issue on an IBM disk. Howze translates the disk to a Mac format and begins working up layout ideas by hand. "Here I disagree with the computer. This phase is best done by hand. It is much quicker to cut and paste by hand. And there is an advantage to layout out the whole story and seeing all the pages at once. You can't do that with a computer."

Because the computer has speeded up the process, the staff has lost a time lag which was a feature of the pre-computer days. They used to be able to depend on this extra time to get other things done while outside vendors were working on their copy. "We don't have this now; we go start to finish on a job much faster," says Howze.

No type now is set outside the agency; internalizing such functions "saves a whole bunch of money." According to Howze, they spent an entire year getting their typesetter up to speed on the computer; during that year they continued to do a lot of cut-and-paste because it was easier than trying to manipulate the program. Now the computers, however, enable them to perform each of their production steps better, more efficiently, precisely and economically.

The integration of desktop into their system has had a major impact on their design staff. The most visible feature of that impact is Steve Long, the director of computer resources for Hawthorne/Wolfe.[9] Long is an example of the new position which is evolving in computerized design and production systems as well as the blending of skills required to handle this position. More than a production manager, Long is responsible for maintaining and upgrading the computer hardware and software. In addition he acts as a kind of liaison or even an interpreter between the designers and the computers.

"I don't want the designers to limit their thinking to what the computer can do," explains Long. "Designers should conceptualize by hand. Then they come to me and I tell them how to transfer their ideas to the computer. Things that would take them hours to do by hand can take five minutes on the computer. They don't need the computer expertise; they depend on me."

Long is a hybrid; trained in art, he began as a cartoonist. The next step was computers and programming and he eventually started his own small printing company. He sold out the business to become a typographer, apprenticing himself to a small typesetting house. Then he began working on a Mac. He brings to his position a unique blend of skills in design, typography and computers — and, according to another staff member, is well paid for what he does.

In addition to Long's position, other job responsiblities are evolving in design at Hawthorne/Wolfe. "Everybody's job description is gray now," says Howze. "We are all doing everything. Designers must be typesetters and have computer skills. . . . What you let the typesetter worry about before is now your responsibility — that letterspacing looks good, kerning, etc. It's now your responsibility that it looks good."

Howze believes that the impact of desktop on the design of Enterprise has been favorable. In saying this he is referring to the impact on the magazine's design process; not the design, or style, of the magazine. "We are still able to design as we always have. . . . We are only limited by the limitations that we place on a publication due to its own objectives."

The design decision process is speeded up by the capability for generating many design alternatives quickly; in addition, idea development is quickened as well, and analytical design skills are sharpened. Howze sees the computer as the most precise, versatile tool available. The only limits, he says, are his skills, budget and imagination.

Howze feels that those who work in roles as editor/designer on desktop-produced publications such as newsletters and other company communications are not really using the full range of capabilities available on the computer. When he put Enterprise on computer, however, he intended to use desktop to its fullest, "to make sure no compromising took place. We brought it to the standards of the publication and did not make it easy on ourselves." The point was to set a firm design idea, to understand the reach of the computer and then to make the computer produce the design he wanted.

The incorporation of desktop into their design and production system did have some impact on editorial content, according to Howze. The result was longer timeframes for gathering latest breaking news within Southwestern Bell. This was particularly important for the section of the magazine called "SBC Recap," a roundup of brief news items filling about four pages.

Texas Medicine

Texas Medicine is a monthly magazine distributed to the 28,000 members of the Texas Medical Association. It regularly runs 80 to 132 pages plus cover; although the front cover is four color, most inside pages run only two colors. One 20-page section is printed over a lightly screened color to distinguish it from the rest of the content; this section is The Journal of Texas Medicine and includes reports on clinical research.

Texas Medicine is organized around sections such as Public Health, Law and Medical Economics, each one a collection of news briefs and short articles. There are few feature pieces (Figure 2, page 28).

The presentation is clear and orderly; many photographs are used, almost all black and white, and the pages — although heavily text copy — have a very open feel thanks to a generous use of white space. In all, it has the look of a publication which has serious content, but yet does not take itself too seriously. Although the layout organization is very formal, there are idiosyncratic touches which make Texas Medicine seem friendlier than one might expect from a medical society's publication.

Hal Kugeler, art director of the magazine, is a senior associate at Fuller, Dyal & Stamper, Inc., Design and Communication, where he has been for the past three and a half years.[10] The agency, located in near south Austin, Texas, across the river from downtown, has more of an offbeat, informal ambiance than Hawthorne/Wolfe. Walls of the entrance area, for example, are painted mauve and are placed at angles odd enough to disorient the directional sense of the first-time visitor. The agency employs 15 to 30 people, depending on the projects and workload.

Although design of Texas Medicine is contracted out to Kugeler, the editorial staff members are employees of the TMA. Kugeler holds an MFA in graphic design from Yale University; he first encountered computers there when Yale was a beta test site for Apple hardware and software during the early 1980s. He considers himself to be computer literate but also well trained in traditional design and production techniques; he is especially interested in the quality of typography and has a great appreciation for the history of the development of type designs.

When Fuller, Dyal switched to computers two years ago, Kugeler trained himself on the new equipment and software and now feels he has mastery over it. In producing the magazine the computer system is used for copy writing and editing, typesetting, design and graphics/illustration and pagination. On his desk sits a Mac IIcx with a 19-inch color monitor, typical of the 22 computer workstations in the agency. All workstations are networked to a black and white laser printer and a QMS 100 color laser printer.

The switch to computers at the agency was done primarily to save time and reduce workload, although saving money and introducing more flexibility and control over the final product were also considerations. According to Kugeler, all of those expectations have been met; he estimates there has been a time saving of 50 percent or more.

For example, Kugeler has the capability to design a magazine cover in full color on his computer screen, and with the color laser printer, he can produce a sample copy of the cover in color for the client's approval. "You don't need a Xacto to make comps any more; doing it that way could take four to five man hours. My most recent cover took 10 minutes." The sample is not production quality, however; the agency does not at this point need to invest in the technology to do the color separations necessary to prepare the cover for printing.

In beginning production for an issue of the magazine, Kugeler is sent a disk with all the editorial copy. He calls up the copy on his screen and formats it for typestyle and size: "No one does typesetting input. The designer formats type that comes in on disk." This is a refinement, however, from the first year on the computers. "In the old days — last year — we would output type from the computer the same as a typesetter. We would then cut and paste the copy and move it around," says Kugeler. "That metaphor is beautifully accomplished on the Mac — we can do all this on the screen, do what we used to do on the floor. It speeds up the process." In addition he has reduced the number of "rough" layouts he does by pencil. His process also involves scanning in photos for placement in the layout.

The finished magazine is recorded on a disk which is then sent to RJL Graphics, the local service bureau used most frequently by the agency for their computer production work. RJL takes care of the job from that point; if there are any problems, RJL handles them. The service bureau converts the information on the disk into either paper camera-ready copy, or a film negative or film positive, which is then sent to the printer. More will be noted about RJL Graphics and its situation below.

According to Kugeler, in his work with the magazine, "Everyone needs to be computer literate." As the designer, he not only creates the page layouts, but is also responsible for producing his job on the computer. There is no position in the firm directly comparable to Steve Long's at Hawthorne/Wolfe, but there is one individual who acts as the "computer guru" in the office. "Josh," a recent electrical engineering graduate of the University of Texas, is responsible for keeping things running smoothly; he does routine maintenance and keeps the machines virus-free. Josh makes no purchase decisions. He worked briefly for RJL Graphics and became interested in design. At Fuller, Dyal & Stamper, he now does some design work in addition to troubleshooting the computers. His status, however, is nowhere near that of Steve Long's at Hawthorne/Wolfe. As Kugeler puts it, "I know the programs; Josh keeps them running right."

Kugeler believes the computer has changed the parameters of his job. "The computer has caused people in this profession to need a much broader knowledge — first we were designers, now we're designers and typesetters, soon we'll be designers, typesetters and color separators/retouchers — eventually printers.

"The fallacy is that the machine replaces the vendor (i.e., 'I don't need a typesetter now I have a computer. . . .'). The truth is the computer replaces the vendor's equipment. You are now the typesetter, and you need to learn how to do that."

To Kugeler, desktop has not improved the process of page design and production, nor has it had any effect on the design of his magazine. The design process is actually slowed down sometimes because of the possibility of generating so many variants of a design. And for pages in the magazine which are standard from issue to issue, desktop has no impact on design. "Clients often want to see . . . 20 or 30 different permutations, combinations – it's hard to say no. For the magazine, the layout of the standing pages is fairly effortless."

Until recently, Kugeler says, the computer's limitations sometimes affected design, but he sees those limitations rapidly evaporating. "The design of pieces in general really hasn't changed. People's stuff still looks very similar to the work they were doing prior to computer." Kugeler adds, however, that illustration suffers on the computer: "Computer-based illustration remains too hard, mathematical, clean. It's difficult to see the human hand."

In his view as desktop becomes more versatile, and as WYSIWYG technology improves, the computer becomes a better design tool rather than a production tool. (WYSIWYG stands for "What You See Is What You Get"; that is, the screen gives a fairly accurate image of the final product.)

Essentially, this designer is intensely appreciative of traditional hand skills, in particular, of typography — the design of type and the history of that design. He feels, for example, that the best design education today for people training for publications work involves "a lot of handwork: setting type in metal, drawing type, making rule lines with a rapidograph, or ruling pen — laying the groundwork, doing the things the computer has made obsolete." Why? Because, he says, the end product will still be ink on paper for a couple of decades yet, and designers should have an intimate knowledge of type and typography.

Kugeler was trained this way, but also in the capabilities of desktop, with which he feels completely comfortable. His viewpoint is that the computer is a powerful design tool, but one that should not take over the design itself. "I abhor design that allows the computer to assert itself to such an extent that it looks computer created; on the other hand I believe the computer will influence design in a positive way.

"The fact that it will be easy to generate new fonts will lead to a lot of ugly fonts, but it should also allow one or two or ten remarkable ones that might otherwise never have happened."

Kugeler does not believe that moving to desktop has had any impact on the content of Texas Medicine. He notes the magazine was recently redirected editorially, but says the decision was made independently of its desktop production.

It is essential here to add a word about RJL Graphics in Austin. This small service bureau developed out of a printing company. Bob Lefebvre, the owner, realized, however, that with the increasing turn to desktop publishing, the printing work going to him and to other Austin printers was drying up.[11] His response was to take a hard look at the way things were developing and figure out how he could fit in.

Because the desktop publishing field is still so unsettled, his service bureau has taken a diversified approach. In fall 1990 he could offer clients output on a Linotronic 300 with a resolution of 2540 dots per inch; a color laserprinter; black and white laser printer; color or black and white scanning; computer time rental; fax service;

typesetting; camera stats; software and font sales; training, and a bulletin board system. In addition, he produces a newsletter updating clients on his services and on desktop techniques. Lefebvre considers himself "unique in town."

His problem is a big one: He constantly has to make decisions about the purchase of equipment which is even higher tech and more expensive than what he has, knowing that the market may change in upcoming months making that purchase worthless. "I try to stay up with the game, figure out which way to go. Right now I'm holding back on color (computerized color separation equipment) because the technology isn't settled yet."

Lefebvre has 15 people in his office, mostly hired from printing businesses which have gone under. These people, he says, must retool their skills in order to stay employed. "They must be Mac literate or have traditional printshop skills. When I go looking for people with both, I get one or the other. I tend to pull people in from the trade. Those skills are harder to develop than computer skills," he says.

He sees his role as a service bureau as an intermediary or liaison between the designer and the printer.

Kansas City Live!

This publication, circulation 112,000, is a "city magazine" begun by the private group insurance company, Blue Cross/Blue Shield, just a few years ago. It has only within the past couple of years gone on the newsstand to a general circulation, but is trying hard to build a following like Texas Monthly. This is difficult in a city currently rocking along uncomfortably in a recession.

Kansas City Live! is a bright, colorful, slick newsstand publication (Figure 3, page 29). It runs about 70 pages plus cover, all with a good bit of four color and spot color. The layouts reflect the more active graphic approach characteristic of a newsstand magazine — especially one which is attempting to convey a sense of excitement about a particular city. Some of the type and graphic treatments work; a few don't work quite so well. Frequently the magazine looks a little too experimental, and a few of the techniques remind one of high school yearbooks — such as the lightly screened pinkish heart run behind copy on a Valentine's story. Others, to be fair, do have a flair and pizzazz more typical of a publication such as D (the Dallas city magazine) or Entertainment Weekly.

The magazine is designed by Lisa Bowser, who has been with Kansas City Live! only since July 1990.[12] As noted above, Bowser had no desktop experience when she began art directing the publication, but two months into the job put out her first issue completely on desktop. Prior to Kansas City Live!, she worked as a designer at Unity, a religious publishing house in Kansas City.

Kansas City Live! is located in an easily overlooked office building south of downtown Kansas City near the trendy Westport neighborhood. Bowser's office is in a fairly large room separated into four spaces by commercial office room dividers. On her desk, amid a clutter of books, magazines, papers and clippings is a Macintosh IIcx with a 19-inch monitor. There is one other Mac IIcx in the office, used by her intern design assistant, Andrew Faw. Along a far wall is a counter on which sits a scanner and a black and white 300 dpi laser printer used for page proofing. If Bowser wants color proofs of any pages, she must rely on a service bureau which in a pinch can give her four-hour or overnight turn-around.

As with Enterprise, the editors here do word processing on the editorial copy using IBMs. Bowser uses File Exchange to translate the disks to the Mac format; then she calls up the copy and changes typestyles, sizes and column widths according to her page design needs. "I build the pages individually. First, I run out (all the copy). I see how much type there is. I know what the visuals are, so I scan in the art. The photos are the most important thing, figuring out where the photos are going to be."

She does an in-house proofing of the pages on the 300 dpi laser printer. However, it is also necessary to get proofs on a laser printer with a higher resolution. Bowser has found that page layouts which look okay when printed at 300 dpi sometimes change when printed at a finer level of reproduction; lines swell or shrink in thickness, for example, and spacing changes. So she has to pay a service bureau to run these higher resolution proofs.

"We could save money," she says, "if we bought a 600 dpi machine for proofing ." Then she could make all her design adjustments in-house and have the service bureau use her disk only to produce film.

Bob Farris is the production manager of the magazine, but his functioning is somewhat different from that of both Steve Long and Josh. He does make decisions about hardware and software purchases, but these are to some extent based on what Bowser wants. Essentially, he is a traffic manager for advertising and editorial. When Bowser began working at the magazine, Farris helped her occasionally on production but lacked the design skills to be of much use. He did not train her on the computers either, so Bowser taught herself on them — and continues to teach herself as much as she needs to know to get new things done.

Bowser has identified a number of problems with her system, mainly having to do with coordination with her service bureau and her printer. Her only use for the service bureau, she says, is for time on their linotronic (a high-resolution printer) in order to run higher resolution proofs of her pages. The bureau used to be a typesetting company, but now — like RJL Graphics — is trying to figure out how to move into the new technology; also like RJL, they are diversifying and have expanded into silk screening.

From her disk the printer outputs her layout on paper (a "mechanical" which is used for making a printing plate). But if problems crop up, the printer is no help. "In the old days, if you had a problem with a board (a mechanical), you could depend on the printer to help you out," Bowser points out. "But now you are your own trouble shooter. You have to solve your problems yourself because printers don't know much."

Another difficulty for her is that sometimes there seems to be no way to print out a design she has created in color on her computer — "no way to output it to see what it looks like because of technological problems. . . . I can get a soft proof — that is, at a lower resolution — but it's not satisfactory. I can't really see how it will look." One solution she has found is to go to a color slide from the disk and use the slide as a proof.

(The difficulty Bowser is describing occurs when a color layout is particularly complicated. The more complex the design, the longer it takes a laser printer to handle it; the color on color laser printers is not exactly matched to printing inks so colors will change in the final printed copy. Also, some screening techniques such as blends are apparently difficult to reproduce on color laser printers.)

Bowser has come a long way with her Mac IIcx in a very few months. Although she has figured out very ably how to integrate it into her magazine design work, she's quick in noting reservations, particularly in the increase in her workload. "On the computer, layout, design, production — all become the same thing. I was hired to do layout and design, but that changed. I'm doing it all."

One of the strengths of the system, according to her, is its rapid generation of layout options which helps greatly in visualizing designs. The computer also enables her to carry out certain design schemes she was unable to do before. "I could visualize some things, but knew I couldn't do them. Now I have the ability to make them real. . . . Before I could have thought a concept up, but had to find a different way to express it. Now I can do it more realistically" (closer to her vision).

Bowser does not yet use the computer for much design work. Instead she prefers to work primarily with pencil and paper in planning layouts. She believes the capabilities of the computer can have an effect on the way she designs, if she allows them to.

"I still do thumbnails, but not half as much as I used to. On feature articles, I almost always do thumbnails. It's easier to work on pen and paper. Otherwise, I just crunch on paper and do things the machine can do instead of relying on my mind.

"I . . . walk around all month with a magazine in my mind. A lot of the time things are focused before I even touch the machine."

To Bowser the desktop system has actually slowed down her process in some ways. From all her experience she is well versed in production and can work quickly doing routine graphics tasks such as sizing photos and selecting color combinations. It is in these production areas where she feels hampered by the computer. Some tasks she can perform faster by hand than she can on the screen — or, as in the past, she could just tell someone else to do it. An example of this last is typesetting. "I used to be able to send out typesetting. Now it really eats up my time. I do it all."

She describes one page which took eight to ten hours to produce on the computer: it was a complex design requiring five overlays to handle the five colors in the layout. This one, she says, could have been done much faster by hand.

Bowser firmly believes that desktop has affected magazine design. "To a point I can tell it's done on computer," she says, noting that obviously Kansas City Live! is because of the type manipulation and visual tricks used in its pages. She doesn't see this as necessarily bad. Rather, she believes that, "We should use the computer as much as possible. It is a modern tool, a reflection of our time. And design should reflect that."

She sees a negative impact as well, though. Desktop has also opened up the field to amateurs who have pulled quality down to the trite and mundane. It has created a bad time for designers because the job market emphasizes computer skills. "But you want more than a computer hack," she says, "You want a good designer. We're in a transition period. . . . It's a real problem."

Much of Bowser's difficulty with her desktop system draws from her inexperience with computers, and the fact that she had to learn the system under the gun. In such situations there is a very high level of frustration and a tendency to avoid the computer when in doubt.

Summary

In many ways what graphic designers told Philip Meggs in 1986 has been borne out by the directions taken by the implementation of desktop publishing technology in magazine design and production. The role of design in publications has not changed, but the role of designers has, and in a direction which places them in more control over the total process and the whole package. They have found, however, that more control also means more responsibility and increased workload. In addition, the computer itself is regarded as a design tool as well as a tool for production shortcuts. What the editors and art directors involved in this research have said is that microcomputers and the software developed for them are changing their design and production systems and reordering the responsibilities and makeup of their staffs.

The small-sized "toy" or inexpensive microcomputers have helped popularize desktop publishing by making computerization affordable. The page layout software programs have enabled an operator to sit at a workstation and put a page together on the screen, arranging typeset articles and artwork — and then print out a reasonably sharp copy of it on a laser printer. The attractiveness of such systems is undeniable; the potential for efficiency, for speed, even for saving money is obvious. Their impact, however, is still working itself out in changed demands on designers and others who provide support services in producing and printing publications.

The 105 art directors and editors who responded to the "Ten-Minute Questionnaire" said that desktop systems were saving them time, allowing them more flexibility in their production, and acting positively on both their design process and the design of their publications. They noted changes in staff assignments because the software enabled one person to handle the tasks done before by several people. The result has been either a reduction in employees or a reassignment of responsibilities, and an increased workload for designers.

The three art directors interviewed in depth agreed with much of this picture. Desktop has affected their design and production process by saving time, adding more flexibility and giving them more control over the final product. Where time-saving is absent, this is due to a lack of familiarity with the desktop system; it probably is not being utilized fully. One of the main impacts on production has been the easing out of the typesetting function. Once a story is fed onto a disk, it is open for any manipulation required in a layout; no retyping is necessary. Thus the position of typesetter has been practically eliminated, which has greatly affected companies used to providing typesetting services.

The addition of computers has changed these magazines' staffs basically in two ways. First, there are gray areas around job descriptions as responsibilities are sorted out and resorted. One early result of this sorting out is that designers themselves have been required to take on more tasks; as one designer put it, in addition to creating the layout for the whole magazine, he also is responsible for typesetting and production. Typesetting in this sense means more than simply selecting type faces and sizes; it also means seeing to the quality of typesetting — including, for example, the spacing between letters, words and lines of type. In a way this is a very natural assumption of responsibility as designers must know typography and production in order to design well. But in their view, it is a skill once located in the province of the typographer/craftsman.

A second change is the evolution of a position formalized most clearly by Steve Long at Hawthorne/Wolfe. This position straddles the fence between the purely technical side of computer hardware and software maintenance and trouble shooting, and the aesthetics of design. This position has sometimes evolved from that of the production manager who used to serve as a liaison between the editorial and design staffs, and the technical, printing side.

These art directors fundamentally agree about the effect of desktop on page design, as well as on the fact that it has certainly speeded up the design process. As commentators noted six years ago, it allows them to produce more alternative designs quickly and to try out certain ideas they couldn't have done before. In fact, there is some sense that design skills are sharpened in this rapid evaluation of design alternatives.

The computer is today a major tool for design and production; as it affects art directors in their workplace by causing them to change their work habits, it affects their creative efforts. The art directors interviewed here were all trained in traditional hands-on layout skills; they all have a deep appreciation for a fundamental understanding of design. These factors positioned them in their attitudes toward desktop publishing.

They regarded the computer as a powerful design tool, but one that required some alertness from them. The computer, with its "value limitations," was not to be permitted control of the design. As professionals, they had to see beyond the design solutions offered by the computer. There was the clearly drawn line in the sand between them and the non-visually trained users. They would take advantage of the computer's strengths but stay in control, maintaining that the computer was primarily a tool — for producing and for realizing design ideas.

Notes

[1] From an interview with Lisa Bowser, Kansas City Live!, Kansas City, Missouri, 4 March, 1991.

[2] Philip B. Meggs, "The Future: New Discoveries, Old Skills," Journal of Graphic Design, 4((1986): 4.

[3] Jonathan Seybold, "The Fourth Wave: Publishing Joins The Computer Mainstream," In Computer Graphics Applications, ed. E. Kenneth Hoffman (Belmont, California: Wadsworth Pub. Co., 1990), p. 121.

[4] Dorothy Spencer, "Much Ado About Desktop," Journal of Graphic Design 4 (1986): 2-3.

[5] Mary Jones, "Graphic Design: Towards Digital Applications. The Synergism Between Visual Communication and Code," Visible Language 19 (Spring 1985): 293-294.

[6] Sharon Helmer Poggenpohl, "Computer Graphics: Bridging the Gap," Visible Language 19 (Spring 1985): 174-175.

[7] "Graphic Design: Computer Graphics. What Do They Mean? How Do They Fit? Interviews with Charles Owen, Roger Remington, Michael Twyman," Visible Language 19 (Spring 1985): 194-199.

[8] Remarks in an interview with John Howze, Hawthorne/Wolfe, St. Louis, Missouri, November 5, 1990.

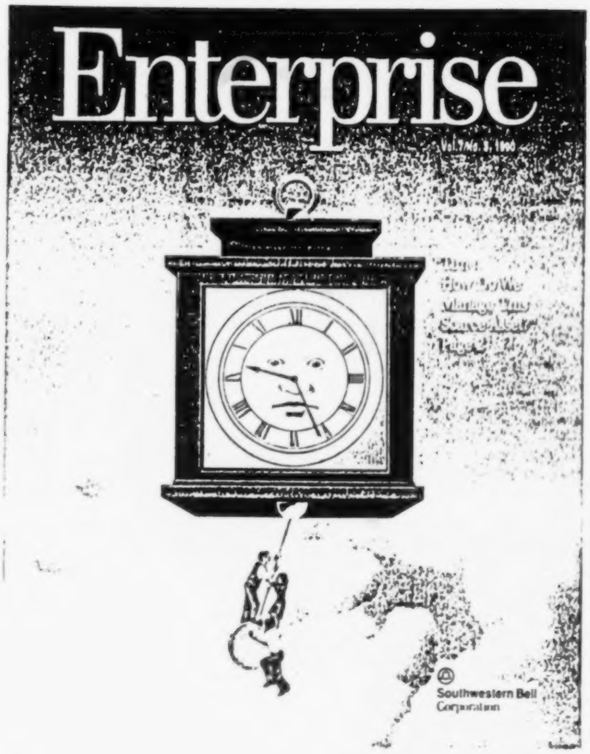
[9] Remarks in an interview with Steven Long, Hawthorne/Wolfe, St. Louis, Missouri, November 5, 1990.

[10] Remarks in an interview with Hal Kugeler, Fuller, Dyal and Stamper, Austin, Texas, November 16, 1990.

[11] Remarks in a telephone interview with Bob Lefebvre, RJL Graphics, Austin, Texas, November 16, 1990.

[12] Remarks in an interview with Lisa Bowser, Kansas City Live!, Kansas City, Missouri, March 4, 1991.

Figure 1. Enterprise

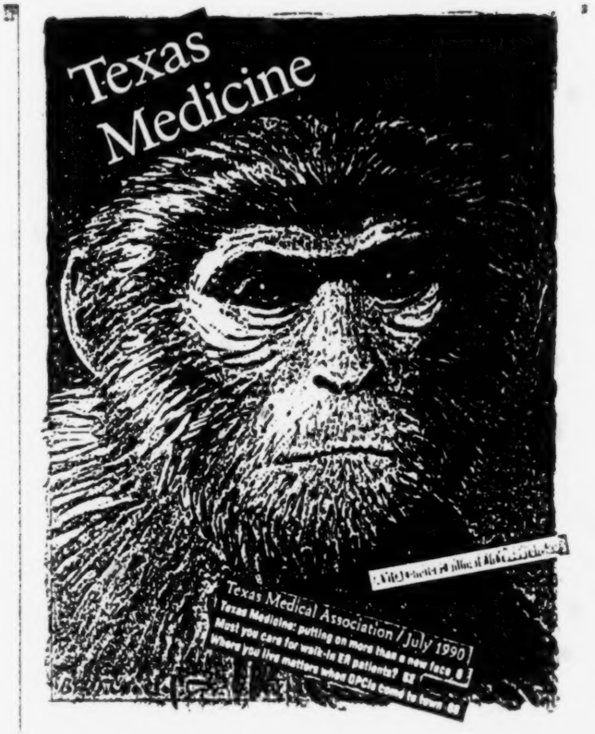

Enterprise
Vol.7/No. 3, 1990
Southwestern Bell
Corporation

It's About Time

Too much to do and not enough time to do it are common complaints; but with a few time saving techniques, help could be on the way.

BEST COPY AVAILABLE

Figure 2. Texas Medicine



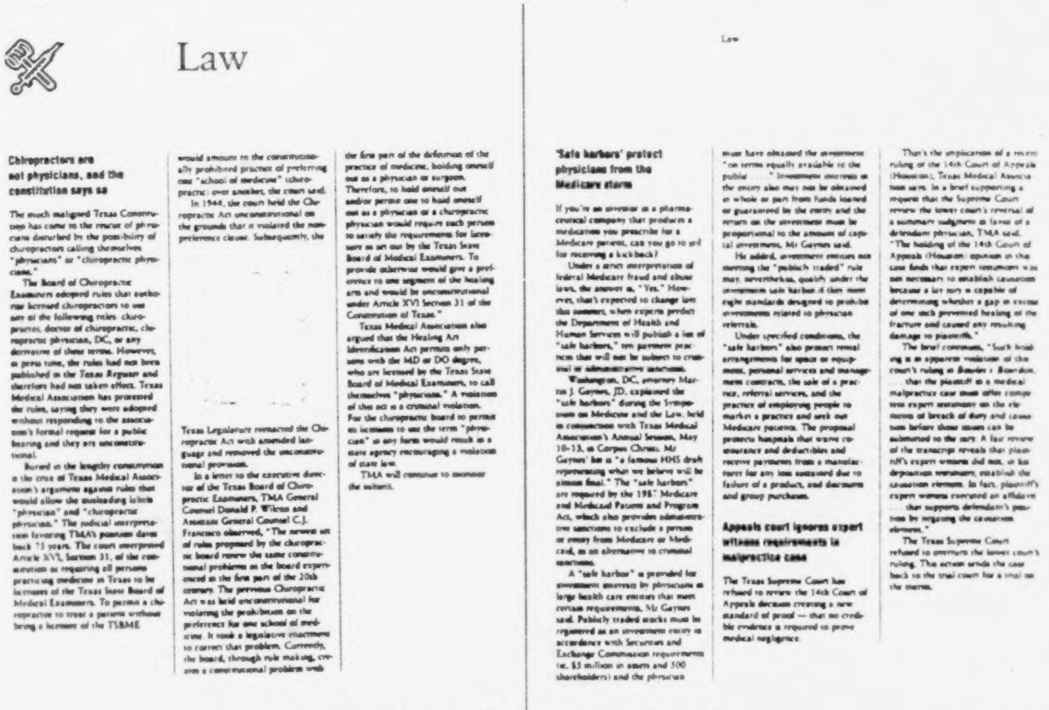
Texas Medicine

Texas Medical Association / July 1990

Texas Medicine: putting on more than a new face 8

Must you care for walk-in ER patients? 52

Where you live matters when DPCIs come to town 60



Law

Chiropractors are not physicians, and the constitution says so

The much maligned Texas Constitution has come to the rescue of physicians disturbed by the possibility of chiropractors calling themselves "physicians" or "chiropractic physicians."

The Board of Chiropractic Examiners adopted rules that authorize licensed chiropractors to use any of the following titles: chiropractor, doctor of chiropractic, chiropractic physician, DC, or any derivative of these terms. However, at press time, the rules had not been published in the *Texas Register* and therefore had not taken effect. Texas Medical Association has protested the rules, saying they were adopted without responding to the association's formal request for a public hearing and they are unconstitutional.

Buried in the lengthy constitution is the crux of Texas Medical Association's argument against rules that would allow the misleading labels "physician" and "chiropractic physician." The judicial interpretation favoring TMA's position dates back 75 years. The court interpreted Article XVI, Section 31, of the constitution as requiring all persons practicing medicine in Texas to be licensees of the Texas State Board of Medical Examiners. To permit a chiropractor to treat a person without being a licensee of the TSBME would amount to the constitutionally prohibited practice of preferring one "school of medicine" (chiropractic) over another, the court said.

In 1944, the court held the Chiropractic Act unconstitutional on the grounds that it violated the nonpreference clause. Subsequently, the Texas Legislature reenacted the Chiropractic Act with amended language and removed the unconstitutional provisions.

In a letter to the executive director of the Texas Board of Chiropractic Examiners, TMA General Counsel Donald P. Wilcox and Assistant General Counsel C.J. Francisco observed, "The newest set of rules proposed by the chiropractic board renew the same constitutional problems as the board experienced in the first part of the 20th century. The previous Chiropractic Act was held unconstitutional for violating the prohibition on the preference for one school of medicine. It took a legislative enactment to correct that problem. Currently, the board, through rule making, creates a constitutional problem with the first part of the definition of the practice of medicine, holding oneself out as a physician or surgeon. Therefore, to hold oneself out and/or permit one to hold oneself out as a physician or a chiropractic physician would require such person to satisfy the requirements for licensure as set out by the Texas State Board of Medical Examiners. To provide otherwise would give a preference to one segment of the healing arts and would be unconstitutional under Article XVI Section 31 of the Constitution of Texas."

Texas Medical Association also argued that the Healing Art Identification Act permits only persons with the MD or DO degree, who are licensed by the Texas State Board of Medical Examiners, to call themselves "physicians." A violation of this act is a criminal violation. For the chiropractic board to permit its licensees to use the term "physician" in any form would result in a state agency encouraging a violation of state law.

TMA will continue to monitor the situation.

Texas Medicine Volume 86 No. 7 July 1990

Law

'Safe harbors' protect physicians from the Medicare storm

If you're an investor in a pharmaceutical company that produces a medication you prescribe for a Medicare patient, can you go to jail for receiving a kickback?

Under a strict interpretation of federal Medicare fraud and abuse laws, the answer is, "Yes." However, that's expected to change late this summer, when experts predict the Department of Health and Human Services will publish a list of "safe harbors," ten payment practices that will not be subject to criminal or administrative sanctions.

Washington, DC, attorney Martin J. Gaynes, JD, explained the "safe harbors" during the Symposium on Medicine and the Law, held in conjunction with Texas Medical Association's Annual Session, May 10-13, in Corpus Christi. Mr Gaynes' list is "a famous HHS draft representing what we believe will be almost final." The "safe harbors" are required by the 1987 Medicare and Medicaid Patient and Program Act, which also provides administrative sanctions to exclude a person or entity from Medicare or Medicaid, as an alternative to criminal sanctions.

A "safe harbor" is provided for investment interests by physicians in large health care entities that meet certain requirements, Mr Gaynes said. Publicly traded stocks must be registered as an investment entity in accordance with Securities and Exchange Commission requirements (ie, $5 million in assets and 500 shareholders) and the physician must have obtained the investment "on terms equally available to the public . . . ." Investment interests in the entity also may not be obtained in whole or part from funds loaned or guaranteed by the entity and the return on the investment must be proportional to the amount of capital investment, Mr Gaynes said.

He added, investment entities not meeting the "publicly traded" rule may, nevertheless, qualify under the investment safe harbor if they meet eight standards designed to prohibit investments related to physician referrals.

Under specified conditions, the "safe harbors" also protect rental arrangements for space or equipment, personal services and management contracts, the sale of a practice, referral services, and the practice of employing people to market a practice and seek out Medicare patients. The proposal protects hospitals that waive coinsurance and deductibles and receive payments from a manufacturer for any loss sustained due to failure of a product, and discounts and group purchases.

Appeals court ignores expert witness requirements in malpractice case

The Texas Supreme Court has refused to review the 14th Court of Appeals decision creating a new standard of proof — that no credible evidence is required to prove medical negligence.

That's the implication of a recent ruling of the 14th Court of Appeals (Houston), Texas Medical Association says. In a brief supporting a request that the Supreme Court review the lower court's reversal of a summary judgment in favor of a defendant physician, TMA said, "The holding of the 14th Court of Appeals (Houston) opinion in this case finds that expert testimony was not necessary to establish causation because a lay jury is capable of determining whether a gap in excess of one inch prevented healing of the fracture and caused any resulting damage to plaintiffs."

The brief continues, "Such holding is an apparent violation of this court's ruling in *Bowles v. Bourdon*, . . . that the plaintiff in a medical malpractice case must offer competent expert testimony on the elements of breach of duty and causation before those issues can be submitted to the jury. A fair review of the transcript reveals that plaintiff's expert witness did not, in his deposition testimony, establish the causation element. In fact, plaintiff's expert witness executed an affidavit . . . that supports defendant's position by negating the causation element."

The Texas Supreme Court refused to overturn the lower court's ruling. This action sends the case back to the trial court for a trial on the merits.

Texas Medicine Volume 86 No. 7 July 1990

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WOMEN WORK IT OUT

BY SUZETTE Q. SCHOLTES

TODAY, WOMEN WANT IT ALL. BUT CAN THEY BALANCE CAREER, FAMILY AND MARRIAGE?

It's an ambitious question, one many women probably wonder about as they climb wearily into their beds at night, ending yet another 16-hour day. Still, we know what some women want, the same thing men want: a career that stimulates and challenges their interests; empowerment through a strong sense of self; commitment with partners at work and home; and a chance to nurture themselves and their families in a caring and safe place.

Unfortunately, since even the most powerful women have just begun to crack the glass ceiling, few role models of women who happily have it all exist. They still cope with cultural attitudes that change at the pace of a glacier movement.

It's only fair to rule out the Jane Pauleys and Joan Lundens of the world. Commanding huge salaries, who wouldn't want to drive to work in a limo while someone else plans your wardrobe?

Yet more doors are open to women than ever before, with 21 million women working outside the home. Some of them have taken a hard look at the realities of having it all. They've

ILLUSTRATION BY PAUL CONRAD

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The Effects of Data Complexity and Display Efficiency on Time Spent Reading Statistical Information in Text, Tables, and Graphs

by
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An experiment using a 3 X 3 X 3 Latin square design tested the effects of the number of data points and type of statistical display on time spent answering questions about the information. The design allowed within-subject comparisons of main effects, thereby controlling for individual differences in reading speed, memory skill, and visual search strategies. Instructions were given, stimuli were presented, and response variables were measured by a Macintosh computer programmed using HyperCard software.

Results partially confirm earlier studies that used information recall as the dependent variable. Accuracy of response to questions about the displayed information was equally good for all three displays tested, but while alphanumeric tables and vertical bar graphs were more quickly read than paragraph of text displaying the same information, there was no significant difference between tables and graphs as earlier studies suggested there would be.

The study suggests that the time variable is a more realistic measure of cognitive processing effort in that, unlike a recall task, the subject is able to answer questions in the presence of the display, thereby eliminating the probability that the experimenter's questions ask for information the did not choose to learn when initially exposed.

Presented to the VisComm Division of the Association of Education in Journalism and Mass Communication for presentation at the annual meeting in Boston, Massachusetts in August 1991.

The Effects of Data Complexity and Display Efficiency on Time Spent Reading Statistical Information in Text, Tables, and Graphs

Answers to the question of how best to display statistical information in printed publications have been proposed on the basis of both professional experience and scientific experimentation since the turn of the century when the modern era and its attendant penchant for statistics began. Debate in professional and academic circles has raged over whether a pie chart is better than a bar graph, whether tables are more easily read than are graphs, whether illustration aids or detracts from comprehension, and a host of other issues.

But after four score years of discussion and experimentation, few definitive guidelines have been agreed upon regarding the most efficient method of presenting statistical data. This paper suggests that the basic question remains largely unresolved because researchers have failed to examine it within the context of cognitive processing theory and have thereby often failed to reliably measure readers' comprehension of statistical information.

The earliest reported experiments on statistical display attempted to determine which of several forms of graphs was read most accurately. In 1926, Walter Eells set out to investigate the relative merits of bar graphs and pie charts by testing subject's ability to estimate the percentage of the whole each segment of a segmented bar chart and of a pie chart comprised.[1] He found that circles performed better than bars, an apparent defeat of expert professional opinion that had earlier suggested that determinations of length were more accurate than those of area.[2]

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[1] Walter Crosby Eells, "The Relative Merits of Circles and Bars for Representing Component Parts," Journal of the American Statistical Association 21, no. 154 (June 1926): 132.

[2] See for example Willard C. Brinton, Graphic Methods for Presenting Facts (New York: The Engineering Magazine Co., 1914), 20-22; and Karl G. Karsten, Charts and Graphs: An Introduction to Graphic Methods in the Control and Analysis of Statistics (New York: Prentice-Hall, 1923), 83.

However, six months later in the same journal, R. von Huhn critiqued Eells' experiment on a number of methodological points. But the fundamental problem he identified was that the judgment criteria used had been inappropriate.[3] Eells had asked students to make judgments of absolute data, but segmented bar charts and circle charts are used primarily to show comparisons.

Nevertheless, several studies afterwards have essentially tried to do the same thing Eells attempted -- to identify the most accurate form of graph. And while they used judgment tasks generally more appropriate to the type of questions the specific graph forms imply, as a whole, they have nevertheless produced rather inconsistent and sometimes contradictory results.[4]

Most of the other research on the presentation of statistical information has attempted to identify the most accurate display form regardless of whether the form is graphical, tabular, or textual.[5] Although the appropriateness of the judgment tasks used is also problematic in several of these studies, and some studies suffer from other methodological flaws, they do, as a whole, suggest that tables and graphs are generally more accurately read than is text.[6]

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[3] von Huhn, R. "A Discussion of the Eells Experiment. Part I of 'Further Studies in the Graphic Use of Circles and Bars'," Journal of the American Statistical Association 22, no. 157 (March 1927): 31-36.

[4] See Frederick E. Croxton, and Roy E. Stryker, "Bar Charts Versus Circle Diagrams," Journal of the American Statistical Association 22, no. 160 (December 1927): 473-82; Frederick E. Croxton, "Some Additional Data. Part II of 'Further Studies in the Graphic Use of Circles and Bars'," Journal of the American Statistical Association 22, no. 157 (March 1927): 36-39; Frederick E. Croxton, and Harold Stein, "Graphic Comparisons by Bars, Squares, Circles, and Cubes," Journal of the American Statistical Association 27, no. 177 (February 1932): 54-60; J.W. Wrightstone, "Conventional Versus Pictorial Graphs," Progressive Education 13, no. 6 (October 1936): 460-63; Lewis V. Peterson, and Wilbur Schramm, "How Accurately Are Different Kinds of Graphs Read?" Audio Visual Communication Review 2, no. 3 (Summer 1954): 178-89; and to a lesser degree, Hugh M. Culbertson, and Richard D. Powers, "A Study of Graph Comprehension Difficulties," Audio Visual Communication Review 7, no. 2 (Spring 1959): 97-110.

[5] See John Noble.Washburn, "An Experimental Study of Various Graphic, Tabular and Textual Methods of Presenting Quantitative Material. Part I," The Journal of Educational Psychology 18, no. 5 (September 1927): 361-76.and "An Experimental Study of Various Graphic, Tabular and Textual Methods of Presenting Quantitative Material. Part II: Numerals and Written Numbers," The Journal of Educational Psychology 18, no. 6 (November 1927): 465-76; Launor F. Carter, "An Experiment on the Design of Tables and Graphs Used for Presenting Numerical Data," Journal of Applied Psychology 31, no. 6 (December 1947): 640-50; Magdalen D. Vernon, "The Visual Presentation of Factual Material," British Journal of Educational Psychology 20 (November 1950): 174-185, and "The Use and Value of Graphical Material in Presenting Quantitative Data," Occupational Psychology 26 (1952): 22-34, and "The Use and Value of Graphical Materials with a Written Text," Occupational Psychology 26 (1952): 96-100; Hugh M. Culbertson, and Richard D. Powers, "A Study of Graph Comprehension Difficulties," Audio Visual Communication

But in virtually all of these studies, accuracy is measured as the ability of subjects to recall (sometimes aided) information previously read from the stimulus. Even when the researcher measures comprehension by asking for a judgment appropriate to the specific form of graph in question, there remains a certain possibility that the information the subject chose to extract from the display was, for a host of reasons, different from the information the researcher asked the subject to recall.

Indeed, in a 1983 review of the literature, Stephen M. Kosslyn et al. generally criticized graph comprehension studies in which subjects had to answer questions from memory instead of responding in the presence of the graphs.[7] He argues that subjects could have perceived the data from the graphs perfectly well, but could have forgotten it rather quickly. This seems to be a plausible interpretation, given the probable lack of interest in topics forced on a subject in an experiment as opposed to that which is read due to some intrinsic interest from a newspaper, magazine, etc. Kosslyn further argues that "the memory requirement can distort not only the absolute amount of information gathered from a graph, but also the differential effectiveness of different types of graphs, or of graphs compared to other media. These possible distortions could be due to the fact that

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Review 7, no. 2 (Spring 1959): 97-110; Howard G. Schutz, "An Evaluation of Formats for Graphic Trend Displays: Experiment II," Human Factors 3 no. 2 (April 1961): 99-107; and Gloria D. Feliciano, Richard D. Powers, and Bryant E. Kearl, "The Presentation of Statistical Information," AV Communication Review 11, no. 3 (May-June 1963): 32-39.

[6] See Michael. Macdonald-Ross, "How Numbers Are Shown: A Review of Research on the Presentation of Quantitative Data in Texts," AV Communication Review 25, no. 4 (Winter 1977): 359-409 for a thorough critique of many of the citations listed in the previous footnote.

[7] Stephen M. Kosslyn, and Steven Pinker with Leon Parkin and William Simcox. Understanding Charts and Graphs: A Project in Applied Cognitive Science (Washington, D.C.: National Institute of Education, January 1983. Text-fiche. ED 238 687).

different sorts of displays may be encoded in different formats in memory (such as images or words, which may decay at different rates)."[8]

Kosslyn's critique is part of an overarching argument that the study of statistical display techniques must be made within the broader context of cognitive processing theory.[9] Thus, effective, efficient design of statistical displays require an understanding of the human visual information processing system, and reliable research in this area must respect the constraints that system places on display design.[10] In other words, the human information-processing system is considerably more than a simple recording device that can be tested by simple playback.

The Purpose of the Study

The purpose of this study is to investigate the relative efficiency of the three statistical display methods commonly used in newspapers and magazines: text, table, and graph. As just discussed, research for this purpose is not new. Indeed, the merits of these three displays were experimentally tested with the specific purpose of addressing a mass media audience by Walter Wilcox nearly 25 years ago.[11] Since then, however, both the relative use and the visual sophistication of graphics by news publications has increased dramatically.[12] But the attendant increase of scholarly interest in just how well these graphic forms communicate has continued to rely on information recall as a measure of communication capability.[13]

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[8] Ibid., 158.

[9] Steven M. Kosslyn, "Graphics and Human Information Processing," Journal of the American Statistical Association 80, no. 391 (September 1985): 499-512.

[10] See Kathryn T. Spoehr, and Stephen W. Lehmkuhle, Visual Information Processing (San Francisco: W.H. Freeman, 1982), for the standard overview of visual information processing.

[11] Walter Wilcox, "Numbers and the News: Graph, Table or Text?" Journalism Quarterly 41, no. 1 (Winter 1964): 38-44.

[12] See James W. Tankard Jr , "Quantitative Graphics in Newspapers." Journalism Quarterly 64, nos. 2 & 3 (Summer/Fall 1987): 406-15, for a contemporary discussion of both the usage and visual characteristics of graphics in newspapers.

Unlike previous research, this experiment measures the *time* a reader spends reading a display in search of answers to specific questions, rather than measuring his or her ability to recall information from memory to answer questions the subject may or may not have posed while committing the information to memory.

The use of time as a dependent variable has several important advantages over the use of recall. Most importantly perhaps, the detrimental effect of inappropriate judgments tasks is eliminated. The subject can be permitted, indeed encouraged, to use whatever processing strategies he or she believes necessary to complete the experimental task since both the question and the answer are available for use during learning and decision making. Although the time spent "reading" a graph may possibly be inflated by attention to other activities, a laboratory environment of minimal visual stimuli and the subject's normal desire to conclude participation as quickly as possible should tend to mitigate confounding influences. In any event, the advantages of using time instead of recall as a measurement of cognitive processing appear considerable and worthy of investigation.

Accurately measuring the time a subject spends answering a battery of questions poses a considerable procedural challenge, as does the administration of a complex designs. But complex designs are advantageous in that they permit the researcher to test variables that are highly susceptible to contamination from previous learning in the experiment itself. And they can also control for the effect of presentation order as well as for the differential influence of subjects' short-term memory skills, reading speeds, visual search strategies, or any other cognitive processing skills used. Therefore, at least part of the purpose of this paper is to demonstrate the feasibility of using a micro-computer to make highly accurate measurements of time as well as to administer complex designs flawlessly to a large subject pool.

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[13] For recent examples in the mass communications area see James W. Tankard Jr , "Effects of Chartoons & Three-Dimensional Graphs on Interest & Information Gain," Newspaper Research Journal 10, no. 3 (Spring 1989): 91-103, and James D. Kelly, "The Data-Ink Ratio and Accuracy of Newspaper Graphs," Journalism Quarterly 66, no. 3 (Fall 1989): 632-9.

Additionally, various processing system restraints identified in recent cognitive processing research have been considered in designing the displays used in this study, hopefully avoiding many of the methodological problems associated with earlier research.[14]

Given that all the information needed to answer each question asked will be available for lookup and no time limit will be imposed on the duration of the lookup procedure, the following hypothesis is made.

> **H1:** The accuracy of a readers response to questions about statistical data will not differ according to whether displayed in a paragraph of text, a table, or a graph.

Based on the limitations of short-term memory to a small amount of information for a short amount of time, the following hypothesis is made:[15]

> **H2:** As the number of individual data points in a statistical display increases, the amount of time a readers spends answering questions about the data also increases.

Based on the encoding efficiency of the various symbol systems used to display statistical data and on previous research on the accuracy of recall from various data display forms, the following hypotheses are made:[16]

> **H3:** A reader will spend less time answering questions about statistical data if it is displayed in a table than if it is displayed in paragraph text form.

> **H4:** A reader will spend less time answering questions about statistical data if it is displayed in a graph than if it is displayed in paragraph text form.

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[14] See Stephen M. Kosslyn, "Understanding Charts and Graphs." Applied Cognitive Psychology 3, no. 3 (July, 1989): 185-226 for an analytic scheme that reveals the design flaws in a display and the perceptual or cognitive processing reasoning underlying each flaw.

[15] For the classic discussion of short-term memory limitations see George A. Miller, "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity For Processing Information," Psychology Review 63, 1956, pp. 81-97.

[16] For elaboration of the symbol systems see Kosslyn, "Understanding Charts and Graphs," 192-194.

H5: A reader will spend less time answering questions about statistical data if it is displayed in a graph than if it is displayed in a table.

Method

The experiment was conducted on randomized groups of 54 subjects using a 3 X 3 X 3 Latin square design with four separate measures of two dependent variables. The design counterbalances both the effects of order and of criterion differences by presenting just a fraction of a full factorial design (nine of the possible 27). The order of presentation (essentially the fourth factor) of two of the factors was random. The primary advantage of this fractional design over a full factorial design is that each subject acts as its own control for the three main effects. This design's fractional nature also eliminates any possible performance improvement due to previous exposure to different levels of the same factor. However, the interaction effect for any two factors is necessarily confounded with the main effect for the remaining factor (since it is "mixed," partially within subjects and partially between subjects). Therefore, in order to examine any interaction effect, there must be no main effect for the remaining factor.[17]

The dependent variable of primary interest to this study was the amount of time a subject took to read and answer a question about the statistical information presented to him or her. Since a variety of differing types of questions may logically be asked of any statistical data set, measurement of the dependent variable was repeated four times, each question ostensibly addressing a different type of knowledge (ie. identification of an specific value, a comparison between two values, identification of a trend, and calculation of a sum total). The second dependent variable was the correctness of response to the questions.

The independent variables were as follows: The first factor (display efficiency) was the type of display, either a paragraph of text, an alphanumeric table, or a vertical bar graph. The second factor (data complexity) was the total number of data points, five values of a single variable, ten values of two variables, or fifteen values of three variables. The third factor (topic) was the content subject matter, either the average weekly wage of U.S. production workers, the total investment level of foreign countries in the U.S., or the number of coins produced by the U.S. Treasury.[18] The design allowed for completely random ordering of the first and second variable, but the order of subject matter was always as listed above.[19] A pretest suggested that the order of the subject matter would have no effect on the dependent variable, thereby allowing for an examination of possible interaction effect between the first and second factors.

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[17] See Everet. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Hougton Mifflin, 1956), 288-292, for a complete description of the design.

Subjects were members of an undergraduate journalism course. Each reported individually at their convenience to an office receptionist who showed them into a small, well-lighted room and sat them at a desk with a Macintosh computer and a mouse. She informed them that the experiment was self paced, that all necessary information would be presented by the computer, and that all responses would be made using the mouse.[20] The computer was programmed using HyperCard software to present a series of instructions, to administer a practice session which familiarized the subject with stimuli pacing and organization, to randomly assign the subject to a presentation order, to administer the stimuli and simultaneously record the time spent with each question and the correctness of each answer, and to then debrief the subject.[21]

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[18] The statistics used in stimuli were taken from The World Almanac and Book of Facts (New York: Newspaper Enterprises Association, 1991), 117, 123, 142.

[19] Please see the appendix for a diagram of the presentation order for each of the nine possible combinations of the display type and number of data points variables.

[20] All members of the class had already become familiar with a Macintosh computer and were proficient with a mouse a because of previous course work.

[21] Time was measured to the nearest sixtieth of a second.

More specifically, when the subject signaled that he or she was ready to begin the actual experiment, one of the nine possible versions of the data on workers' wages would appear in the top portion of the screen and an unseen timer began.[22] Simultaneously, the first of four questions would appear across the bottom of the screen and immediately under it were three, large "buttons" labeled with possible responses. When the subject "clicked" the mouse on any one of the buttons, the time spent reading and answering the question was recorded to a subject file. Whether or not the answer was correct was also recorded and then the second question replaced the first, in a noticeably different location. The information display remained on the screen as the four questions were presented and answered, then a blank "resting" screen was presented. A click of the button on that screen began the information and questions about foreign investment and then after another resting screen, the display on coin production was presented. Approximately seven minutes was needed to complete the entire session.[23]

Given the large number of subjects per cell (18) and the high degree of accuracy in measuring both the time spent responding and the accuracy of responses, a probability level of $p \leq .01$ was set for statistical significance.

Results

Each dependent variable – amount of time spent reading the display and answering the questions, and accuracy of response to the questions – was analyzed separately. A new cumulative variable representing the total time spent on all four of the questions about a given display was created through simple addition. Likewise, a new cumulative variable representing the accuracy of response to all four questions was created by scoring a correct response as one, otherwise as zero, adding them together, and dividing by four.

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[22] The actual screen size measured eight inches wide and six and a quarter inches deep and displayed a black on white image.

[23] Please see the appendix for examples of the screen presentation of the stimuli.

To begin, an analysis of variance (henceforth ANOVA) was made to test whether there were any significant differences in response accuracy between the three independent variables. The subject variable was also entered into the model to account for the subject to subject variation that would otherwise go into the error term. Although the total number of observations in the analysis was 162, each subject made three of those observations, one per independent variable.

Because of the small F value of 1.15 for the entire model it was impossible to reject the null hypothesis that the means of the independent variables were equal. Indeed, given that the grand mean of all responses was 0.975, there was very little variability at all. More simply put, of the 648 questions answered, only 16 were answered incorrectly. These results confirm the first hypothesis that the accuracy of a readers response to questions about statistical data will not differ according to whether displayed in a paragraph of text, a table, or a graph. See table 1.

Table 1. **ANOVA Results of the Main Effects Model, Percentage Correct On All Four Questions Is Dependent**

source of variation	**sum of squares**	**df**	**F value**
Model	.4591	59	1.15
Error	.6921	102	
Total	1.1512	161	
main effects:			
Subjects	.3595	53	1.00
Number of data points	.0193	2	1.42
Type of display	.0609	2	4.49
Subject topic	.0193	2	1.42
R-square 0.3988			

*p<.01 **p<.001 ***p<.0001

Another ANOVA was made to test for differences in the total response time between the independent variables. Again, the subject variable was included in the model to account for subject variation.

The F value for the model was large and significant at the p≤.01 level. The F value for the subjects classification was large and significant and demonstrates the value of the design's property of controlling for individual differences between factor levels. Also, the F values for each of the three independent variables were all large and significant. See table 2.

Table 2. **ANOVA Results of the Main Effects Model, Total Time Spent On All Four Questions Is Dependent**

source of variation	sum of squares	df	F value
Model	59764.	59	5.88 ***
Error	17580.	102	
Total	77345.	161	
main effects:			
Subjects	23411.	53	2.56 ***
Number of data points	11563.	2	33.55 ***
Type of display	20904.	2	60.65 ***
Subject topic	3884.	2	11.27 ***

R-square 0.7727

*p<.01 **p<.001 ***p<.0001

While these results provide firm footing for a rejection of the null hypotheses that means for each variable are equal, differences between the means on the subject topic variable preclude examination of the possible interaction effect between number of data points and type of display since in a Latin square design, interaction effects between two factors are necessarily confounded with the remaining main effect and therefore unreliable.

Post hoc analysis of the the means of the three levels of the subject topic variable indicated that the only significant differences were between the first and second topic presented and between the first and third. The means of the second and third were nearly identical. See table 3.

Table 3. ***Post hoc* Analysis of the Subject Topic Mean Times** (in seconds) **Using Tukey's Studentized Range Test**

subject topic	mean	N	Tukey grouping
Wages	61.71	54	A
Investments	51.35	54	B
Coin Production	51.31	54	B

Means with the same letter are not significantly different at the $p \leq .01$ level.

The design randomized the presentation order of the number of data points and of the display type, but not of subject topic. The distribution of the means on the subject topic variable suggests that an order effect may be present, even though subjects went through a practice session prior to exposure to the measured stimuli. Regardless, the differences between levels of the topic variable precluded inclusion of an interaction term between display type and the number of data points variables in the model.

To facilitate the inclusion of such an effect, the variance in the subject topic factor was removed by weighting each score so that the mean for each level was equal to the grand mean for the subject topic variable. In the ANOVA of the same model, this weighting procedure produced an F value of 0.0 for subject topic in the main effects model without substantially altering the sum of squares for the other effects. See table 4.

Table 4. **ANOVA Results of the Main Effects Model, Total Time Spent On All Four Questions Is Dependent and the Mean for Subject Topic is Equalized**

source of variation	sum of squares	df	F value
Model	55470.	59	5.44 ***
Error	17641.	102	
Total	73110.	161	
main effects:			
Subjects	23462.	53	2.56 ***
Number of data points	11255.	2	33.55 ***
Type of display	20752.	2	60.65 ***
Subject topic	0.	2	0.00

R-square 0.7587

*p<.01 **p<.001 ***p<.0001

A complete model including the main effects of number of data points, type of display and an interaction effect between these two variables was subjected to ANOVA. The F value for the model was again large enough to be significant, as where the main effects of number of data points and type of display, but the interaction effect was not significant. See table 5.

Table 5. **ANOVA Results of the Complete Model, Total Time Spent On All Four Questions Is Dependent**

source of variation	sum of squares	df	F value
Model	56849.	61	5.73 ***
Error	16260.	100	
Total	73110.	161	
main effects:			
Subjects	23462.	53	2.72 ***
Number of data points	11255.	2	34.61 ***
Type of display	20752.	2	63.81 ***
interaction:			
data points X display	1380.	4	2.12
R-square 0.7776			

*p<.01 **p<.001 ***p<.0001

Post hoc analysis of the main effects in the complete model indicate that for both variables, only one level is significantly different from the other two. Specifically, there is a significant difference between the time spent reading from a paragraph of text and either a table or a graph, but no reliable difference between a table and a graph. Likewise, there is a significant difference between the time spent reading from a display of five data points and displays of either ten or fifteen points, but not between displays of ten and fifteen. See table 6.

Table 6. ***Post hoc* Analysis of the Mean Times (in seconds) for Type of Display and Number of Data Points Using Tukey's Studentized Range Test**

display type	**mean**	**N**	**Tukey grouping**
Text	70.79	54	A
Table	46.43	54	B
Graph	47.14	54	B
number of data points			
5 data points	43.34	54	A
10 data points	58.07	54	B
15 data points	62.95	54	B

Means with the same letter are not significantly different at the $p \leq .01$ level.

These results confirm the third hypothesis that a reader will spend less time answering questions about statistical data if it is displayed in a table than if it is displayed in paragraph text form. And they confirm the fourth hypothesis that a reader will spend less time answering questions about statistical data if it is displayed in a graph than if it is displayed in paragraph text form.

But they do not support the fifth hypothesis that a reader will spend less time answering questions about statistical data if it is displayed in a graph than if it is displayed in a table. And they only partially support the second hypothesis that as the number of individual data points in a statistical display increases, the amount of time a readers spends answering questions about the data also increases, since although there was a significant difference between five and ten data points, the difference between ten and fifteen data points was not significant.

As a final test of the data, four separate ANOVAs were made using the complete model used above, but where the dependent variable was in each case the time spent responding to a single question. In each analyses, the interaction effect was not significant but the main effects were significant at the $p \leq .01$ level and the post hoc tests likewise indicated that in each case, the pattern of significant differences was identical to that found in the cumulative dependent variable analysis reported above.

Discussion

The use of time as a measure of cognitive processing appears quite workable, as does the use of a Macintosh microcomputer to administer complex designs and make accurate measurements.

As did most previous research, this study found that graphs and tables are more effective forms of statistical data display than is a paragraph of text. But unlike some earlier studies, it found no significant difference between tables and graphs. This suggests that, at least for the simple task of looking up answers to the questions posed, either visual array is more efficient than the linear array of data in text form, just as current theorizing in cognitive science about the efficiency of encoding from visual displays would suggest.[24]

These confirmatory findings are particular because they where made using a completely different variable to measure the mental processing associated with statistical displays. In the presence of the display, virtually all subjects could answer questions accurately, but the time it takes to accomplish the task differs according to the way the information is arranged. Although still artificial in that the question was posed by an experimenter rather than by the reader himself, the task is much more similar to readers' actual behavior when reading a newspaper or magazine for statistical information. But because the search task is based on the display rather than on the memory of the display, the incidence of inappropriate judgment tasks is largely eliminated, thereby rectifying a fundamental criticism of data display research.

Additionally, this study demonstrated the feasibility of two methodological innovations for display research. The first was the use of a fractional experimental design .

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[24] See especially Steven Pinker, A Theory of Graph Comprehension, Occasional Paper No. 15, Cambridge: MIT Center for Cognitive Sciences, 1982, and an article in press to appear in Cognitive Science under the same title.

Previous studies had been generally careful about minimizing the effects of presentation order and/or subject learning during the experiment, but had usually solved these problems with between-subject designs that left open the possibility that differences between individuals participating in the experiment introduced considerable undetected error into the measured variable. The Latin square design used here appears to have identified and accounted for a substantial portion type of this type of error given that the subject variance in this experiment amounted to approximately 40 percent of the variance within the model. Individual differences seem to matter a great deal in this case.

The second methodological innovation was the use of a Macintosh microcomputer. While other computers could have performed identical tasks, the HyperCard scripting is so simple that detailed knowledge of computer programing was unnecessary. This permitted the researcher direct control over procedures rather than via a technician. And since Macintoshes produce virtually all graphics at U.S. newspapers and magazines, the visual characteristics of the displays can more closely resemble those used in the mass media.

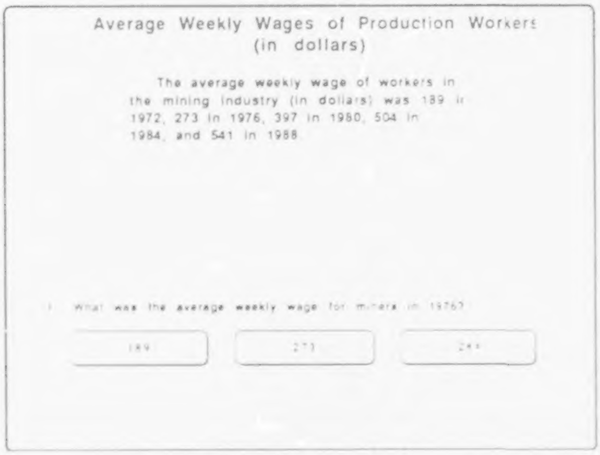
As with any laboratory experiment, direct advice to media professionals is speculative at best -- people do not normally read on command. But this study does suggest that spatial displays of statistics are processed more efficiently that are linear displays, strengthening the same argument used my most contemporary graphic communi–cators. Pulling stats out of copy and making a graph not only provides an additional "entry point" and a "break in the gray," it also probably increases the ease of reading. Hopefully, this demonstration of the two new research techniques will assist future research exploring how readers read statistical information.

Appendix
Examples of Stimulus Displays

Subjects	Group 1	Wages 1 Var Text	Invest 2 Var Table	Coins 3 Var Graph
	Group 2	Wages 3 Var Table	Invest 1 Var Graph	Coins 2 Var Text
	Group 3	Wages 2 Var Graph	Invest 3 Var Text	Coins 1 Var Table
	Group 4	Wages 2 Var Text	Invest 3 Var Table	Coins 1 Var Graph
	Group 5	Wages 1 Var Table	Invest 2 Var Graph	Coins 3 Var Text
	Group 6	Wages 3 Var Graph	Invest 1 Var Text	Coins 2 Var Table
	Group 7	Wages 3 Var Text	Invest 1 Var Table	Coins 2 Var Graph
	Group 8	Wages 2 Var Table	Invest 3 Var Graph	Coins 1 Var Text
	Group 9	Wages 1 Var Graph	Invest 2 Var Text	Coins 3 Var Table

Appendix
Examples of Stimulus Displays

Text Display
one variable (five values)
first question position

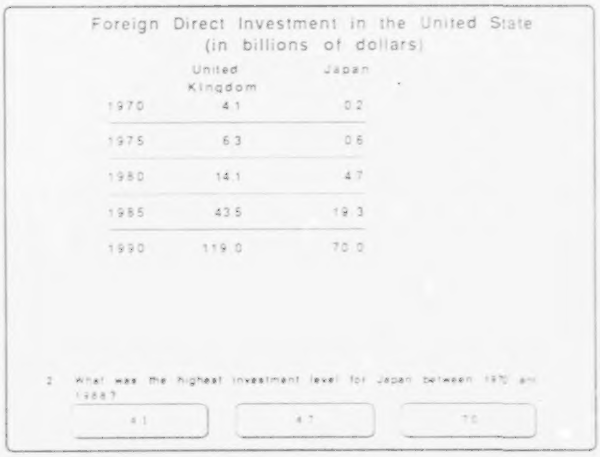


Average Weekly Wages of Production Workers
(in dollars)

The average weekly wage of workers in the mining industry (in dollars) was 189 in 1972, 273 in 1976, 397 in 1980, 504 in 1984, and 541 in 1988.

1. What was the average weekly wage for miners in 1976?

Table Display
two variable (ten values)
second question position

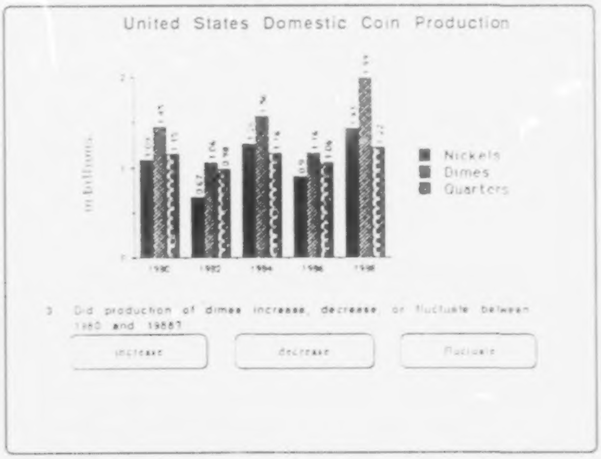


Foreign Direct Investment in the United State
(in billions of dollars)

	United Kingdom	Japan
1970	4.1	0.2
1975	6.3	0.6
1980	14.1	4.7
1985	43.5	19.3
1990	119.0	70.0

2. What was the highest investment level for Japan between 1970 an 1988?

Graph Display
three variable (fifteen values)
third question position



United States Domestic Coin Production

3. Did production of dimes increase, decrease, or fluctuate between 1980 and 1988?

in billions
2
1
0
1980
1982
1984
1986
1988
Nickels
Dimes
Quarters
1.45
1.15
0.67
1.06
0.98
1.16
0.9
1.16
1.06
increase
decrease
fluctuate

TECHNICAL AND POLICY ISSUES CONCERNING ACCESS TO THE GEOSYNCHRONOUS ORBIT AND RADIO FREQUENCY SPECTRUM

A paper submitted to:
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ABSTRACT

TECHNICAL AND POLICY ISSUES CONCERNING ACCESS TO THE GEOSYNCHRONOUS ORBIT AND RADIO FREQUENCY SPECTRUM

The purpose of this paper is to review the technologies, concepts, and requirements of the communication satellite policy-making process in order to explore the international issues surrounding access to the geosynchronous orbit and radio frequency spectrum. Much of this access debate focuses on the allocation of space resources to users via a "first come, first served" approach versus the recent trend of allocation via a planned "a priori" approach. These approaches are analyzed in terms of the growing concern of developing nations to increase international cooperation and to provide equitable access for all nations. The roles of the International Telecommunication Union, developed nations, and developing nations are presented to review past access decisions, to clarify present access policies, and to project future access possibilities that will be examined at the 1992 World Administrative Conference.

One of the unique aspects of the politics of communications satellites is that policy disputes are often disguised by a complicated technical maze. For example, the hotly-contested issue of whether direct broadcast satellites may aim their programming to countries who may not want them, is translated to a question concerning "power flux densities" or "sidelobe suppression" (Dornheim, 1988). This seemingly benign technical gloss tends to deflect laypersons away from the immediate and far-reaching economic stakes hinging on the standards being negotiated. This paper will review the technologies, concepts, and requirements of the satellite communications policy making process in order to explore the international issues surrounding access to orbit/spectrum space and satellite communications.

The fact that this technical maze is now being analyzed and discussed openly by many nations is, in itself, a significant indication of the politicization of the satellite orbit/spectrum resource. Knowledge about information technologies is bargaining power. Consequently, nations discussing satellite spectrum space must comprehend a wide range of technical and engineering technologies, as well as appreciate economic, political, and military ramifications inherent in technical standards and procedures. Of course, since the highly developed countries possess the most advanced technologies, they are also more familiar with engineering and technical parameters that will best promote their interests. However, as this past decade has shown, the developing countries are trying hard to narrow the information gap involving satellite communications (Koehler, 1987, p. 33).

THE RESOURCES

The geosynchronous orbit and the radio spectrum are paradoxical resources. They are often considered scarce within the infinite reaches of outer space. They are designated as natural, and yet have no substance. They are called resources, but are non-depletable in the sense that they are not consumed after use has ceased. They both resemble locations, one being a flight path that behaves as a place. The other is a region among electromagnetic energy fields that move at the speed of light. They both have incalculable value for political, economic, and military purposes, and yet, they cannot be owned (Bruce, Cunard & Director, 1986).

THE GEOSYNCHRONOUS ORBIT

The special qualities of the geosynchronous orbit are in many respects a coincidence of physical laws:

> Earth satellites orbit about the center of the earth with a period determined by the radius of the orbit. At a radius of some 42,165 km, corresponding to an altitude of 35,787 km, a satellite has a period of 23 hours 56 minutes and is therefore synchronous with the period of the earth's rotation (i.e., geo-synchronous). Chetty, 1988.

This is the family of orbits designated as "geosynchronous" by the ITU, where "an earth satellite's period of revolution is equal to the period of rotation of the earth about its axis (ITU, Final Acts, WARC-ST, 1971). A geosynchronous satellite is found by an earth-bound observer at the same spot in the sky at the same time each day. A geosynchronous satellite's position is expressed in terms of degrees of longitude corresponding to the point on the equator over which it appears to hover, a designation that identifies portions of the orbit assigned to satellites as "parking slots" (Long, 1987).

Having defined the geosynchronous orbit, the question inevitably arises: Why is it such a desirable area of outer space? There are two chief reasons for the usefulness of this orbit for communications: (1) the apparent motionlessness of the satellite, and (2) its characteristic height above the earth.

Because a satellite in geosynchronous orbit appears motionless to an observer on earth, it is also "stationary" with respect to narrow-aperature microwave dish antennas which must accurately fix upon the satellite in order to collect sufficient amounts of its weak signals. Because the target satellite does not appreciably move, neither do the earth station antennas, eliminating the need for expensive computer-controlled tracking equipment (Long, 1987).

The stationary quality of the satellite has caused a cost inversion in the design of satellite systems. Due to the fact that the first communications satellites, such as Early Bird, were physically small with only basic station-keeping capabilities and very weak transmitters, the system's major investment was concentrated in the earth segment's large, precisely pointed antenna structures and highly sensitive receivers (Chetty, 1988).

Beginning in the early 1970s, communications satellites have become progressively larger, more powerful, and virtually driftless in their orbits, changes allowing the use of smaller and less expensive earth stations. The savings realized in thousands of simplified earth stations greatly offset the extra expense for more precise station-keeping systems, solar cells, and higher power satellite transmitters (Morgan, 1980). In short, this cost inversion has made satellite networks consisting of thousands of earth stations economically feasible. The chief economic advantage of satellite communications lies in the satellite's ability to interconnect many widely dispersed earth stations with high-capacity data links.

The connectivity advantage of the geosynchronous orbit stems from the satellite's characteristic height of 22,300 miles. From a hovering point above the equator a satellite can see, and be seen, from over 40 percent of the earth's surface. As postulated by writer-scientist Arthur C. Clarke in 1945, three satellites in geosynchronous orbit can see and interconnect any two communicators between any inhabited areas on earth (Long, 1987).

Combined with the stationary characteristic, the connectivity function projects a revolutionary role for satellite communications in terms of reducing the costs of information distribution (Chetty, 1988). For the first time in the history of communications, the concept of distance has little or no effect on the costs of disseminating information. The cost of satellite communication is distance insensitive.

Cost insensitivity to distance and the connectivity function of satellite communications are a consequence of the fact that once service is established, no additional costs are incurred in beaming data to an additional earth station or communicator within its service area (Howell, 1986). The satellite can send its signal to all visible receivers, regardless of their location or distance relative to each other. For this reason, satellites offer important technical and economic advantages over cable or microwave point-to-point relay networks (Rutkowski, 1985, p.12).

For example, a satellite telecommunications network may consist of hundreds of earth stations located thousands of miles apart, and yet they are all interconnected with each other through a common satellite. The satellite, by concentrating its beams between two or three high volume traffic "gateways," can relay great amounts of data and other forms of traffic for the same distance-insensitive price (Rutkowski, p. 13). This is the pattern of satellite beams found over the North Atlantic, where INTELSAT satellites link COMSAT teleports in the US with their Western European counterparts.

The capacity (or scarcity) of the geosynchronous orbit is determined by two sets of resource related factors: physical and spectrum capacity (Levin, 1988, p.58). Physical capacity is the number of satellites that can be placed in the geosynchronous orbit with a negligible probability of collision. Spectrum capacity refers to the number of satellite communications systems that can operate on the same frequency bands without harmful interference to each other.

Since the first geosynchronous satellite was launched in 1963, the number of satellites in the geosynchronous orbit (GSO) has continued to grow. Over the last decade, the number of satellites in this orbit increased about 18 percent per year (Dornheim, 1988). Like the radio spectrum, the GSO is widely considered a limited natural resource. Although this orbit can hold a multitude of satellites without a risk of collision, the number of satellites that can operate in the GSO on a given frequency without consequent radio interference is much more limited (Levin, p.66). The issue of crowding in the GSO is a highly politically-charged debate, with many divergent viewpoints.

The lesser developed countries, in particular, hold that while they are becoming technologically and economically able to place satellites in the GSO, orbital positions for their satellites are rapidly diminishing. The more developed nations maintain that technological advances will preclude any real congestion of the orbit. Thus, the developed nations feel that a more laissez-faire approach to regulation of the GSO is in order, while the developing nations call for strict planning and procedures (Koehler, p.33).

Although the simple and inexpensive earth station assumes a major role in developing countries strategies and plans for direct satellite broadcasting by both developing and developed countries, it also poses costs in terms of efficient orbit/spectrum utilization and capacity. In many technical respects, the controversy in the ITU over orbit/spectrum management comes down to the trade-off between orbit/spectrum conservation and the design and cost of earth station antennas (Savage, 1989). Briefly, the larger, and therefore, more expensive the earth station antenna, the closer together the satellites may be placed in the geosynchronous orbit using the same frequency bands. If smaller antennas are used, the satellites must be placed farther apart to avoid interference. Smaller antennas are, technically, less efficient users of the orbit/spectrum resource because they are less capable of discriminating between signals from closely spaced satellites (Savage, 1989). In order to more fully analyze the arguments over access to the orbit/spectrum, it is also necessary to consider the spectrum resource.

THE RADIO SPECTRUM

The radio spectrum can serve as a communications pathway by intentionally deforming or "modulating" electromagnetic waves. A transmitting antenna radiates waves into space where they are collected by receiving antennas. The receiving equipment also demodulates, or interprets, the deformations in the waves, thereby extracting data or information transmitted by the sender (Chetty, 1988).

The spectrum is a phenomenon of nature and is accessible to just about anyone with even basic technology. As such, the spectrum is a global common resource due to its universal accessibility and non-excludability. However, these characteristics invite interference, the spectrum's chief limitation for universal or unlimited use. To many communicators, transmitting simultaneously on the same frequencies will cause "harmful interference" (White & White, Jr., 1988). The spectrum, as well as the GSO, are both limited by electromagnetic interference.

For this reason, effective and efficient use of the orbit and spectrum resources requires coordination between users. Due to their mutual need to communicate, nations perceive strong incentives compelling cooperation even at some cost to national sovereignty. In a political sense, then, the spectrum forces nations to relegate a portion of their spectrum rights as sovereign nations to an international regulator and manager of the resource, the ITU. This is the political cost of spectrum scarcity.

The spectrum's scarcity is heightened by its non-uniformity or uneven applicability for various types of telecommunications services (Morgan, p.27). Certain portions of the frequency spectrum are more desirable than others. Prior to the1980s, most communication satellites used radio spectrum frequencies below 10 GHz. At frequencies above 10 GHz, attenuation of the radio signal could occur in heavy rainfall, and at even higher frequencies the gases of the atmosphere posed a greater problem. These natural interference factors were augmented by the fact that in order to use a frequency above 10 GHz, the system operator would have to use greater amounts of power to generate the signal (Howell, 1986). This, of course, inevitably relates to increased cost for this increase in power. And, those nations, especially those developing nations with only a limited amount of capital to spend on satellite communications, were searching for the least expensive access to the spectrum available.

Therefore, until the mid-1980s, the lower frequency C band, operating in the 6/4 GHz band, was most in demand because the technology for this frequency range was the oldest, the cheapest to operate, and the least susceptible to rain attenuation. The keen competition for use of the C band, frequencies that have been widely used and shared by both terrestrial and space communication services, established the historical basis for claims of the GSO and radio spectrum (Savage, 1989).

Since 1980, however, expansion of services into higher frequency ranges has increased production and lowered costs for the Ku band (14/12 GHz) (Savage, 1989). And, substantial improvements in system designs and operational technologies have reduced the limitations of atmospheric attenuation, leading many of the **developed** nations to maintain that technological innovation can solve the problems related to congestion in the GSO and radio frequency spectrum. Yet, the overriding current disadvantage to using these higher frequencies is that the present cost of implementing the systems is more than the cost of well-established systems. A greater demand still exists for the lower C band frequencies, especially from the **developing** nations.

TECHNICAL ACCESS

Technical access to the satellite spectrum is accomplished by launching a satellite into the geosynchronous orbit and communicating with that satellite using radio waves. Briefly, a satellite communications system works as a three-stage process: (1) earth-to-space, called the "uplink"; (2) the signal processing in the satellite itself, designated as the "space segment"; and (3) space-to-earth segment called the "downlink" (Morteshar, 1986).

Telecommunications traffic, or messages in the form of telephone, television, or other data services, is transmitted as electromagnetic signals, or radio waves, from the satellite dish of an earth station to a particular satellite "parked" in the geosynchronous orbit. The satellite receives the signals through its onboard receiving antennas. The satellite's electronics then re-amplify and re-transmit the signals on a lower frequency back to earth. Earth stations collect the signals in dish antennas and send them to receivers that process and direct the signals into the terrestrial telecommunications network and on to the user (Morteshar, p.3).

Technical access requires the following: (1) a satellite, (2) a launcher, (3) earth stations, and (4) access to favorable portions of the geostationary orbit and radio spectrum on an interference-free basis. Fundamental differences between these components of technical access focus attention on the orbit/spectrum resource (Chetty, 1988). The first three can be purchased from a growing number of suppliers for prices that decline with economies of scale, maturing technologies, and growing international competition between equipment manufacturers.

However, interference-free access to the orbit/spectrum resource cannot be purchased, since it does not result from the actions of any single country. Instead, access to the resources depends on the cooperation of other users. Since they belong to no one country, they belong to all countries.

TECHNICAL ACCESS AND THE ITU

Very early in the history of radio it became apparent that international cooperation was necessary in order for radio communication to fulfill its true potential. The countries using radio at that time created an unofficial international organization, known as the International Radiotelegraph Union, to draw up the necessary international standards and regulations (Levy, 1984). In 1936 the International Radiotelegraph Union merged with the older International Telegraph Union to create the International Telecommunication Union (ITU). When communication by satellite became feasible, the ITU took over the role of providing a forum for countries to draw up the standards and regulations necessary for this new technology to be incorporated into the world's telecommunication system (Morteshar, p.6).

The ITU is the intergovernmental organization that allocates, regulates, and manages the valuable, but limited, orbit/spectrum resources. The ITU World Administrative Radio Conferences draw up legal guidelines under which a particular user may gain the internationally recognized right to interference-free use (Bruce, Cunard & Director, 1986). In short, the ITUs mission is to formulate agreements among its member nations on procedures designed to permit all nations the use of the orbit and spectrum resources free from interference. How should the ITU allocate rights to the orbit/spectrum resource? Should nations receive a right upon demonstrating that they are already planning or actually using the resources (the "first-come, first-served" approach)? Or, are nations entitled to portions of the orbit/spectrum resource solely on the basis of their existence as sovereign states and members of the ITU (the "detailed a priori planning" approach), even though they may not use their allotments for years to come?

Avoiding or reducing interference between users is the overriding goal of the ITU resource management rules (Morteshar, p.8). Avoidance of interference, in turn, is accomplished through accurate assessments of the capacity of the resources given a particular technology and the number of users. Seen in this way, technical access is a function of the capacity, or scarcity of the resources. Moreover, scarcity is the primary motivator in the debate over access to the spectrum and it controls the ability of any nation or state to establish a satellite communications network.

For this paper, the most important ITU bodies are the administrative conferences (WARCs) and the five member elected International Frequency Registration Board (IFRB). It is the ITU international radio conferences , in which each member of the 167 members of the ITU has an equal vote, that establishes the Radio Regulations containing the rules for gaining access to space resources and the process by which a country gains the right to use those resources without the threat of harmful interference from other systems.

Probably the most important change in the ITU since it was created in 1934, and one which has a strong bearing on this subject, has been its evolution from an organization dominated by a few developed nations to one in which the vast majority of its members are developing nations with different interests and needs in the field of telecommunications (Stoddard, 1987).

ALLOCATION OF FREQUENCIES TO SATELLITE SYSTEMS

One of the more important functions of the ITU is the maintenance of the Table of Frequency Allocations. The Table is a record of the allocation of discrete portions of the usable radio frequency spectrum to specific types of radio services made by administrative radio conferences over the years. Several dozen different uses of radio, including satellite communication, have been given allocations of frequencies in the Table.

As new radio services came into being, they requested and were given discrete portions of the usable frequency spectrum for their own use. As the radio spectrum became more and more crowded with services, despite the expansion of the usable frequency range, the process of adjusting the Table of Frequency Allocations became increasingly complicated (Codding & Rutkowski, 1982). As a result, WARCs with the authority to revise the Table became the scene of serious confrontations. Services began to compete actively with each other for frequency bands or portions of frequency bands, and countries that tended to use one service in preference to another also entered the competition (Codding & Rutkowski, 1982). Government needs, including military considerations, have also continued to play an important role in the allocation procedure. This process is clarified by Anthony M. Rutkowski:

> There are often important technical reasons for making these allocations. There are also safety, marketing, and scientific

> considerations which dictate certain results. However, the bases for many, if not most, of the allocations lie in domestic and international political-economics. Various user groups find the allocation process a convenient means of securing a guaranteed monopoly of use or an advantage for themselves. Intense lobbying usually accompanies domestic and international allocation proceedings. (Codding & Rutkowski, p251).

The Allocation Table is complicated by a number of practices that have evolved over the years. One such practice is to permit more than one radio service to operate in the same frequency band. For example, the 14.47-14.5 GHz frequency band is shared by the fixed radio, fixed satellite, mobile, and radio astronomy services. Another practice is to give different levels of priorities to services. In the above example, for instance, the fixed radio, fixed satellite, and mobile services are all classified as "primary" and thus have equal rights to use the frequency band in question. The radio astronomy service, however, is classified as "secondary" and thus cannot cause harmful interference to stations of the other services. Nor can it claim protection from harmful interference from those stations. In addition, in those frequency bands where it is feasible, different allocations in the same frequency band are made for different regions of the earth (White & White, Jr., 1988).

One final practice that makes it difficult to know exactly how any specific frequency band is being used is that which allows individual countries or groups of countries to deviate from the overall allocation scheme. These deviations, which are extensive, are indicated by a number of "footnotes" (Levy, 1984). For example, the 13.4-14 GHz band is allocated throughout the world to the radiolocation service on a primary basis, and to the standard frequency and time signal satellite and space research services on a secondary basis. However, according to footnote 853, this band and the band 13.25-13.4 GHz are also allocated to the fixed service on a primary basis in Bangladesh, India, and Pakistan. According to footnote 854, thirty-nine other countries also allocated the band 13.4-14 GHz to fixed and mobile services on a primary basis, and according to footnote 855 eleven other countries also allocate this band to the radio navigation service on a primary basis (White & White, Jr., 1988).

Therefore, if satellite communication continues to grow along with other radio uses throughout the world, those interests involved in satellites, whether government or private, will find it necessary to assert all of the interest they can muster in future ITU conferences in order to continue to have the allocations they need in the ITU's Frequency Allocation Table.

OBTAINING THE RIGHT TO USE SPACE RESOURCES

Making certain that the necessary bands of radio frequencies are allocated to the various communication services of the world is only one of the various problems facing those who would provide a satellite communication system. Another problem, just as important, is that of obtaining the right to use frequencies in the allocated bands and the accompanying geosynchronous orbit without suffering harmful interference from other similar systems.

For the government or private entity that intends to provide a satellite communication system the process has two parts (Dornheim, 1988). First, the right to use the space resources in question must be recognized and approved by an agency of the user's own government. Second, the use of the space resource must be recognized by an agency of the ITU known as the International Frequency Registration Board (IFRB). Two different international procedures for obtaining this right to use certain frequencies and the associated geosynchronous orbit have evolved. They are the first-come, first-served procedure and the a priori procedure (Levin, 1988).

THE FIRST-COME, FIRST-SERVED PROCEDURE

Prior to the advent of satellite communications, the ITU relied primarily on the first-come, first-served procedure. According to this procedure, national telecommunication administrations notified the ITU's International Frequency Registration Board of frequencies to be used by domestic radio stations if: (1) the frequencies in question were capable of causing harmful interference to any other radio service; (2) the frequencies were to be used for international communication; or (3) the administration desired "to obtain international recognition of the use of the frequency" (Morteshar, 1986).

The IFRB examined each notification for its conformity with the ITU Convention and Radio Regulations, and for the possibility that it would cause harmful interference to a station whose frequency had already been registered by the IFRB in the Master International Frequency Register. If the findings of the Board were satisfactory, the Board proceeded to enter the frequency in question in the Master Register, and the date of that registration determined the rights of that radio station against those of other stations. In the event of an unfavorable finding, there were a number of provisional and appellate procedures that could in result in an eventual entry of that notification in the Master Register with full or secondary rights (Savage, 1989).

The 1963 Extraordinary Administrative Radio Conference, the first ITU conference to be dedicated solely to satellite communication, decided that a similar notification and recording procedure should be used (Pelton, 1988). The 1971 WARC for Space Communications then introduced a modified procedure containing three major components instead of two: advance publication, final coordination, and recording into the Master Register (Pelton, 1988). The advance publication process mandates that administrations planning a satellite system notify the IFRB of that fact, along with providing information concerning the system's main characteristics, between five and two years in advance of bringing that system into service. If another administration feels that the new system might cause harmful interference with one of its existing or planned satellite systems, all administrations involved are asked to work out any differences they may have including, if necessary, changing orbital positions and frequencies. The IFRB keeps the members of the ITU informed of the progress of the negotiations and provides assistance to the parties in reaching agreement if so requested (Savage, 1989). **The resolution of any potential conflict rests entirely on the good faith of the administrations concerned.**

The second phase of the process is final bilateral coordination of the assignment. If bilateral coordination is requested by an administration, all of those involved are required to exchange detailed information about their systems through the intermediary of the IFRB and try to work out their differences. If they are not successful, the IFRB becomes automatically involved in the process. This can include a request by the Board to the parties to adopt a compromise, or an assessment by the Board of the actual interference, if any, that the new system might cause to other satellite systems (Savage, 1989). **As is the case of advanced notification, the resolution of any potential conflict rests entirely on the good faith of the administrations concerned.**

The third phase of entering the system into the Master Register remains essentially the same. Yet, dissatisfaction with certain aspects of the first two phases of the first-come, first-served procedure has resulted in the a priori procedure for certain types of communication services.

THE A PRIORI PROCEDURE

The a priori procedure involves the allotment of space resources to countries according to a pre-arranged formula via the medium of a formal treaty. This approach found its beginnings in terrestrial communications in the 1920s, but has only recently been applied, not without a struggle, to space communications (Koehler, 1987).

The use of the a priori procedure for satellite communications had its beginnings in the fears on the part of delegates of some of the developing countries that there would be no space resources left for their use when the time came that they could employ satellite communication. This fear that space resources, including the geosynchronous orbit, would soon be monopolized by the developed (i.e. richer) countries under the first-come, first-served procedure became an extremely controversial issue at the ITU's 1971 Space Conference (Pelton, 1988).

After affirming the first-come, first-served procedure, the conference adopted a recommendation which proclaimed that "all countries have equal rights in the use of both the radio frequencies allocated to various space radiocommunication services and the geostationary satellite orbit for these services" and that "registration with the ITU of frequency assignments for space radiocommunication services and their use should not provide any permanent priority for any individual country or groups of countries and should not create an obstacle to the establishment of space systems by other countries" (ITU, Final Acts, 1971).

Even more important to the future of the use of the a priori procedure for satellite communication at the 1971 Space Conference were the discussions dealing specifically with the use of satellites for broadcasting. By the time of that conference it was fairly certain that it would soon be possible to broadcast television programs from a satellite directly into the homes of viewers. Extensive discussions had taken place in the United Nations and UNESCO concerning the right of a country to broadcast its programs into homes of citizens of other countries without that country's permission.

After further discussion of this subject, and the subject of possible unintentional spillover of signals from one country to another, the conference adopted a modification of a French and British proposal to the effect that the ITU should call a conference to plan the new broadcasting satellite service (Savage, 1989). In the minds of most delegates, this was a call to negotiate an a priori treaty which would protect their countries from unwanted broadcasts from another country.

The United States was the principal, and almost the only, country opposed to the calling of a conference for this purpose. The US delegation argued forcefully, but unsuccessfully, that putting country "name tags" on radio frequency channels and GSOs would place severe restrictions on the future use of those resources (Codding & Rutkowski, 1982). Its concerns went unheeded again in 1973, as the ITU Plenipotentiary Conference gave additional support to those who favored the a priori procedure by designating radio frequencies and the GSO as "limited natural resources" that "must be used efficiently and economically so that countries or groups of countries may have equitable access to both in conformity with the provisions of the Radio Regulations according to their needs and the technical facilities at their disposal" (ITU, International Telecommunication Convention, 1973).

REGULATORY TECHNIQUES

Without a definitive technical answer to the orbit/spectrum debate, administrative and regulatory techniques have been proposed since the 1973 ITU Plenipotentiary Conference to help solve the problems of orbital congestion associated with the use of the radio spectrum in the GSO. These techniques include international planning of the fixed-satellite service in operation today for broadcast applications (as opposed to the very new mobile-satellite service being developed), and new coordination procedures that incorporate concepts like "burden sharing" to facilitate and to implement the coordination of satellite networks (Pelton, 1988).

It has been suggested, for instance, that the capacity to reposition a satellite be incorporated into its design. This would permit readjustment of satellite positions if necessary or appropriate to accommodate a new satellite system. Still, it would be difficult to readjust the positions of all satellites and their associated earth stations anytime a new satellite is placed into the GSO.

As a result of the growing concern over a possible orbit capacity shortage spurred by the 1973 ITU Plenipotentiary Conference, the General World Administrative Radio Conference held in 1979 called for a special WARC to discuss and "guarantee in practice for all countries equitable access to the geostationary satellite orbit and the frequency bands allocated to space services" (Codding & Rutkowski< 1982).

THE 1985 WARC

The first session of the two-session special conference was held in 1985: the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (WARC-ORB-85). At this conference, proposals for planning and for new coordination techniques were put forth, with final determinations to be made on them at the second session of the conference in 1988.

Long-term planning of the GSO, using the a priori approach, for the fixed-satellite service in specific frequency bands was one proposal made at WARC-ORB-85 (Naraine, 1985). There was continued broad support at the 1985 conference by the developing countries for planning of space services. Such planning might guarantee to each nation the use of a specific frequency or frequencies to be used by a satellite in an orbital location.

Another alternative proposed at WARC-ORB-85 was a new multilateral method for satellite coordination to augment the current bilateral process (Naraine, 1985). Periodic multilateral planning meetings were recommended as one means for gaining access to the GSO and to radio frequencies. These international meetings would adjust the current allocation plan as necessary and would mediate any necessary "burden sharing" between administrations. This plan was suggested by the United States as a substitute for the a priori allotment plan desired by many of the administrations present at this conference.

The difficulty here occurred over the specific frequency bands allocated to the fixed satellite service that should be the subject of a priori planning. The US and several developed nations argued for the multilateral planning approach as it would not interfere with the commercial and governmental uses that were already allocated. A group of developing countries, however, proposed an a priori plan for all of the fixed satellite frequency bands below 31 GHz. (These are the most established, cheapest, and most widely used frequency bands in the spectrum.) (Stoddard, 1987).

Burden sharing was also proposed as a way to help implement the various technical and operational problems associated with international harmonizing of the satellite systems in the GSO. This concept recognizes that the various steps toward harmonization can be a "burden" to be shared between existing and new systems. This concept includes various elements like satellite relocation, elements that would be shared both operationally and economically between administrations concerned (Naraine, 1985). The possible implementation of burden sharing and of multilateral planning meetings were to be decided at the 1988 conference.

THE 1988 WARC

Under the chairmanship of Dr. I. Stojanovic of Yugoslavia, the 1988 conference produced a Final Acts containing what the delegates felt was a good compromise plan for achieving equitable access for the fixed satellite communication service. The Final Acts are valid for a period of twenty years, beginning this year, or until revision by a competent ITU administrative radio conference.

There are two components to the Final Acts of the 1988 Space WARC, an a priori allotment plan for satellite communication services in certain frequency bands involving existing services, and an "improved" procedure for bringing into service satellite communication systems in certain other frequency bands (Savage, 1989). Therefore, a compromise was essentially reached between the members of this 1988 conference in deciding the contested issues of the 1985 conference. This was summed up by the head of the US delegation:

> The tension between the desires of developed and developing nations was focused on the issue of existing systems. Developed nations wanted those systems included on a par with allotments in the Plan. Developing countries were concerned that such accommodation would result in a less than optimum Plan or in some manner give precedence to existing systems over national allotments.....Ultimately a compromise was reached on the length of operation, led by efforts of administrations with existing systems. The other concern--that existing systems would take precedence over allotments in the Plan--was addressed through strong wording that existing systems would bear the burden of making adjustments needed to coordinate with allotments in the Plan when they are converted to assignments (US, Dept. of State, 1989).

The Final Acts also provide for the creation of subregional satellite communication systems by groups of member administrations (ITU, Final Acts, 1988). Subregional in this sense involves the creation of a satellite system among neighboring countries to provide domestic or regional services within the geographical areas of the countries concerned. This may allow neighboring developing countries to pool their resources, financially and technically, to form satellite communication systems that were not available before. This will be an interesting area to watch in the future, especially if this regional cooperation leads to a country being able to eventually use its national allotment for its own satellite communication system.

THE FUTURE

Given the rapid pace of development in relatively recent history, it is extremely difficult to predict accurately what the future will hold for orbit/spectrum users and policy makers. Undoubtedly there will be new applications for the use of the spectrum which are difficult to imagine now. There will be an inevitable increase in demand for nearly all services, especially those concerned with mobile applications, business use, computing and entertainment. At the national level, it may be difficult to cope with the demand without resorting to additional spectrum sharing or reassigning of domestic frequencies being used by the government. Hearings before the House Subcommittee on Telecommunications and Finance in February of this year were considering such proposals. Without reassignment of some domestic frequencies, new technological developments may have to be relied upon to make sharing more feasible and to cope with the administrative burden of regulating spectrum usage being undertaken by the FCC and Congress.

At the international level, some means must be found for maintaining the essential international harmonization while enabling services to continue to develop at an ever increasing rate. Perhaps the role of the ITU will develop into one of providing the forum for developing a broad framework which will allow sufficient flexibility in allocations and time periods for use at the regional or national level.

Certainly, long established definitions of radio services and the rigid subdivision of the spectrum between different applications will be very hard pressed to cope with future demands. An indication of this breakdown in rigidness was shown by the allocation compromise during the 1988 Space WARC. Whatever the developments in store for the next 5, 10, 15 years, there is no doubt that spectrum management will be a growth business and one that will assume a higher profile as the true value of the spectrum becomes more greatly appreciated. The ITU has opened the door to the skies, through its Final Acts of the 1988 Space WARC, accommodating developed and developing countries for the time being. Continued cooperation between nations, as well as competent national communication strategies, must be followed in order to ensure open access to this highly coveted, yet strictly limited, global resource.

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Toward a Theory of Picture Editing and Use in Printed Publication

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Toward a Theory of Picture Editing and Use in Printed Publications

This paper is concerned with content, with readers, and with the way in which they are brought together on a visual plane.

A printed medium communicates visually. The words which carry the verbal content are presented as visual symbols on a page, and these are supplemented, expanded or recommended to the reader by the overall visual design of the vehicle, by the typography (such as headlines or groupings and placement of type), by the use of graphic devices such as maps, charts and artwork, by color and by photographs and by combinations of these elements.

This paper will consider specifically the role of photographs in bringing readers and content together in printed communication (especially newspapers) and will consider that role in the context of a series of editing decisions.

The purpose of this paper is to bring empirical studies on pictures and picture presentation performed in several fields, notably mass communication and psychology (and related fields of human studies), together with the literature of professional experience and practice in an attempt to arrive at a model (or, by a bit of pretension perhaps, a theory) which will help focus future research and which may also provide, by the same token, a teachable structure.

The intent is to analyze the relationship between reader, content and form in search of principles which may allow editors to make decisions that will increase reader interest and satisfaction predictably, and which may thus help to bring the reader repeatedly to this (printed) medium in expectation of that satisfaction.

To the extent this effort is successful in identifying a body of tested and accepted principles of picture use, the result could be described as a canon of picture editing.

Environmental Validity:

Before proceeding, it may be well to confront directly one conceptual hurdle. Some of the work cited was performed by researchers in disciplines other than mass communication, to improve communication with audiences more limited than "mass", and to gain an outcome that seems intuitively different from that sought by mass media. Some involves line drawings rather than photos. Much of this work was done in the fields of audiovisual teaching technology and psychology, uses students as subjects (sometimes quite young ones at that), and aims at a measurable improvement of fairly traditional learning.

Given this degree of difference in discipline, subject and expected outcome, is it valid to draw on this material to develop a model intended to apply to printed organs of mass communication? To put the question sharply, is it logical to draw on research aimed at more effective textbooks and audiovisual presentations and to arrive at conclusions about newspapers?

The validity of this material for the purpose at hand may be confirmed on at least two levels.

The face validity of this work (generally) is superficially low (as noted above), but examination of methods, results and conclusions raises this considerably. Moreover, important parts of this work turn out to have very high face validity. They involve newspapers directly, or relationships directly parallel with those found in newspapers.

The second level is concurrent validity. Are there points at which results reported from this work may be compared with results from mass communications research that have withstood time and test? Again, this paper will draw parallels suggesting a high level of concurrent validity.

The question of validity is related directly to the contribution this paper is intended to make. It has been common to mention a paucity of research when writing on the field of publication photography.[1] Should the validity of the "outside" work included in this paper be accepted for the purposes to which it is here applied, it will make a substantial contribution toward filling that gap and providing a legitimate theoretical setting for future research.

Structure:

What follows will be a review of the literature in search of the model proposed above. It will draw largely on three identifiable bodies of research: Mass communication, behavioral psychology and cognitive psychology. The mass communication literature, including the literature of professional practice, provides the structural skeleton of this review. The psychological work was done in (mostly) sequential development but will be selected here by subject to flesh out the operational structure.

Since the psychological material appears here by topic (rather than chronology) it may be well to review briefly the history and structure of this work as a basis for understanding its conceptual base and relevance.

Psychology and Visual Communication

Psychologists, especially those concerned with education, have been interested in pictures as elements of communicative packages at least since the 1930s. Several notable studies of pictures in an art context precede this work and are cited as antecedents. This is especially true of work considering or related to the Bauhaus movement in art and the parallel rise of Gestalt psychology in Europe. This early body of "art psychology" continues to have some influence in teaching of principles of art, and in providing specific examples of practical visual understandings useful to picture editors and photographers, but they have been largely superseded by more sophisticated psychological scholarship on the theoretical plane. Sless offers a good thumbnail review of the remaining influence of Gestalt and the "legacy of the Bauhaus."[2]

The Behavioral Approach:

The psychologists of education, operating typically in a behavioral psychology approach, built a substantial body of experimental work in the period between the late 1930s and the early 1970s. Most of these studies proceeded from the stimulus/response paradigm that postulated a controlling position for the stimulus: Present the correct stimulus and a predictable response would follow.

This work has been admirably summed up by Levie and Lentz, who present a meta-analysis of some 135 experiments and studies.[3] The results of this work constitute a mixed bag. Early work on images (most of it "paired associates learning") was inconclusive, though later work established support for several aspects of our understanding of work with photographs. Work from the latter part of this period which remains of interest includes that of Attneave,[4] Berlyne,[5] Hochberg[6] and Gombrich.[7]

The Cognitive Approach:

In the early 1970s, new (and much more powerful) theories and research methods became available to educational psychologists through work in cognition and neuropsychology, together with work in information processing, and most recently, its protege, schema theory. This shift is of major import within the field of psychology for a variety of reasons only vaguely relevant here. But from the point of view of the visual journalist, the key issue involves the reader. Stimulus/response theory provides only a rather limited understanding of the reader. The underlying assumption that one had only to produce a given stimulus to evoke a predictable response conflicts at its base with much of what was known even then of readers.

This later work proceeds from more complex assumptions having a higher face validity in the eyes of journalists, and more direct application to the work of the visual journalist. The assumption is that a reader is an active participant in the process. The reader decides what material will receive attention, and the degree to which that material will be processed into usable (storable, retrievable) form. The face validity of this understanding relative to known reader behavior should be obvious to any observant practitioner of visual journalism (or any other aspect of journalism, advertising or public relations, for that matter).[8]

Schema theory neatly relates these understandings to practical work, postulating that readers bring a library of mental image structures to the task of perception and recognition, seek and apply the one deemed most relevant, then "fill in the blanks" from the detail presented by the image, or from stored mental images as required. This schema then structures the reader's understanding of the image.[9]

Even if schema theory is not fully supported by continuing experimental work, it is an obviously heuristic model for the continuing study of media imagery, at least until a more powerful model emerges.

Mental Images:

Mention should be made at this point of a related line of enquiry which seems to have considerable promise. A hotly debated issue in cognitive psychology is the question of how images are ultimately stored in the brain. Is there a lasting, separate, analog storage, or are images translated into a digital (or propositional) code for storage along with words in a single memory bank; and what are the information processing implications of the answer?[10]

This debate parallels (and correlates with) the question of left-brain/right-brain function among neuropsychologists. If these questions can be brought to a workable degree of closure, new and exciting directions for enquiry will be suggested. Unfortunately, it is probably safe to say that closure continues to elude workers in this field. Although the most recent work seems to suggest conclusions favoring a single processing and storage system, this remains a field to watch.[11]

A Canon of Picture Editing

What is known about the editing of still photographs for mass media application may be considered conveniently within a framework of decision points on the road they follow to publication. These could be divided in several ways, but this paper proposes the following seven: Imperatives to use (readership and motivational issues); selection and cropping of images; finished size; positioning; use of color (in the image itself); use of related type (headlines and captions); and inter-image relationships (the so-called "third effect").

This paper proposes to break this obvious chronology, placing the first two items at the end of the discussion in order to move directly from them to conclusions concerning questions they raise. Thus the first item to be considered is size.

Size:

Size, that is, the amount of precious space that properly should be allowed an image (or group of them) is debated daily on the desks of newspapers and is an issue of interest to audiovisual development as well. It is natural then that it should be a continuing topic of speculation and research, especially in mass media studies.

The first reported professional research was apparently "The Continuing Study of Newspaper Reading" conducted from 1936 until 1950 and beyond by the Advertising Research Foundation.[12] Woodburn reviewed early studies in 1947;[13] Spaulding reviewed results from an educational perspective in 1955;[14] Swanson,[15] and later Stamm[16] and Sanders,[17] reviewed results from a mass media standpoint and working with a summary of 138 studies published by the sponsors in 1957. Kalish and Edom reviewed early studies from a photojournalism perspective in 1951.[18]

The continuing study was truly massive and lengthy. Each of its several reviewers accepted its findings that size of the published photograph substantially influenced its readership, regardless of content category or position. This study suggests that the enlargement of a photograph by just one column may increase readership very considerably. Arnold proposes that the increase may be exponential: a two-column picture may have four times the readership of a one-column.[19]

Baxter, et al, established that size of a photograph was a positive factor in increased readership of related news stories. This work was done with experimental manipulations of a real newspaper page using intercept interviews with adults.[20]

Professional literature, such as McDougall and Hampton,[21] Hurley and McDougall,[22] Finberg and Itule,[23] and Evans[24] suggest that size and clarity of significant detail in an image is a factor in establishing a minimum effective picture size. Meyers, for instance, discovered that moderate use of some images may be preferred.[25] Certainly it may be concluded that a picture must be fairly simple and clear to be effective at smaller sizes. The question is complex and empirical data is not sufficient to support specific recommendation on size in publication.

Work on professional practice from the field of newspaper design, such as that of Arnold,[26] Garcia,[27] Baskette, Scissors and Brooks,[28] and Finberg and Itule,[29] is more decisive, suggesting that the primary illustration on a page be large enough that it becomes a "dominant element" (but other considerations such as color and nature of the image itself appear to be factors in establishing dominance). Stempel and Garcia provided empirical evidence that readers appreciated the use of larger photographs.[30]

Psychological attention to the question of size has been less productive. Treisman and Gelade,[31] and Treisman, Sykes and Gelade,[32] call attention to size as a factor in attention to pictorial features but provide little evidence. Willows[33] and Brody,[34] reviewing literature on picture/text variables, identify size as one of the important variables in research on pictures, but note that it is often inadequately reported.

Moore and Sasse found what may be a point of diminishing returns, but this work involved projected images many times larger than a newspaper. When size is related to viewing distance, however, this work provokes suspicion that there may well be an ideal limit to the size of a photograph in newspapers as well.[35] Dwyer experimented with image size using television sets of several sizes for instruction, with mixed results, but suggests that in some cases a moderate size is preferred.[36]

Holliday suggests that, at least in the field of science education, conclusions concerning the effects of picture size on learners are premature.[37]

It may be slightly ironic that Levie and Lentz cite the Baxter, Quarles and Kosak study noted above to substantiate their contention that larger pictures are more effective in gaining and holding attention in educational text.[38] It may also lend support for the acceptance of cross-disciplinary validity this work as suggested by this paper.

Position:

A number of empirical studies, such as those of Neubert, Meyers, Bogush and several cited by Hartley, have examined the question of position.[39] The best summary conclusion from these studies seems to be, it's an important question.

The traditional sources of guidance in professional literature, such as Hicks, Hurley and McDougall, McDougall and Hampton and Evans,[40] unfortunately are not specific either. What is agreed on by all sources is that illustrative photography ideally should be physically close to referent copy, but where seems to be a matter of a large array of factors: The organizational structure of the page or layout surrounding the items in question; the intended purpose (as explanatory or attentional); its visual impact (or eye-drawing power); its thrust (direction); its color; its relationship (visually or by content) to other photographs or art work, its shape relative to other elements and quite possibly other, unidentified, considerations.

What seems clear as a pragmatic conclusion is that the importance of the photograph as a visual "magnet", combined with the relative (to type) inflexibility imposed by questions of crop, size, color and caption/headline relationships (treated elsewhere) suggests that the position the picture is to occupy in the layout should be established very early in the process, with other elements brought in later to establish the desired relationships.

It would also seem to follow that position of pictures should be established in light of the above considerations rather than by arbitrary formula, and that page design should allow maximum freedom of position, size and shape in order to meet these conditions. This contention has been tested by Peterson with encouraging results.[41]

Color:

The use of color images, both photographs and colored line drawings and art work, have been extensively studied both by mass media scholars and by psychologists. The literature here is beyond exhaustive review, but is also uniform in conclusions: Color is very effective by whatever yardstick the researcher chooses to measure. Some recent studies may establish parameters.

Bohle and Garcia approached the question from the mass media perspective, studying background color, typographical use of color, and color photographs, using some fifteen experimental pages.[42] Generally, color was found to be effective on virtually every dimension examined. Gilbert and Schleuder reached similar conclusions in researching the question of film-type choice.[43]

Two partial exceptions turned up in the Bohle and Garcia study, one surprising, the other expectable on the basis of typographical studies. It was found that too heavy a tint behind type reduced its readership (no surprise). It was also found that any photograph, even reproduced in black and white, remained the page's primary "visual magnet" regardless of the use of color elements on the same page.

A totally different type of study, continued over some seventeen studies involving hundreds of experiments, is reported by Dwyer, who explored the effectiveness of illustration in teaching science, using well-developed and tightly controlled packages of illustrations and test materials, and using techniques involving both verbal and visual (drawing) testing.[44] The experiments were extensive, and some of the results are difficult to interpret precisely, but the overall conclusions are clear. Illustrations work, and they work best in color.

Click and Stempel reached similar conclusions of high reader acceptance of color from a design point of view in two studies they reported.[45]

Similar and supporting results of note include those of Benbasat and Dexter,[46] Bundesen and Pedersen,[47] Eysenck,[48] Katzman and Nyenhuis,[49] Pipps.[50]

Related text:

The question of type related to photographs has been extensively studied by both mass media scholars and psychologists. On this topic the weight shifts to the psychologists. Again the conclusions are persuasive.

There may be some ends still loose from the days of S/R research, but not many. Modern psychologists have established experimentally that that relationship is very much as Hicks defined it almost forty years ago, working entirely intuitively and anecdotally, in his classic text, Words and Pictures.[51]

Especially interesting on this count is work by Bahrick and Gharrity with composite pictures and both related and unrelated (nonsense) captions.[52] They used recall of captions as their test, using three versions: a caption created as a reaction to background image, a caption created as a reaction to the foreground image (with the pictures then combined), and a caption carefully screened to relate to neither. The results supporting the value of captions is striking because their methods (strange to the eye of the mass media scholar) allowed them to be specific about the role of each of a variety of elements within the picture/word combination.

At least three quarters of the 135 studies reviewed by Levie and Lentz involved the relationship of words and pictures.[53] They drew nine conclusions from meta-analysis of reported findings. Most of these are directly concerned with instructional attributes of this relationship, but important in the context of this paper is empirical evidence that "people like pictures, and rate (text) materials that contain illustrations as more enjoyable." They go on to note that because this is true, pictures can contribute to the objectives of the words. They note further that illustrations have a role in helping readers understand and remember what they read.

An interesting note on the reciprocal importance of words and pictures is contributed by Booler,[54] who studied Navy instruction manuals and found that pictures influenced the speed of comprehension, but that words were required for accuracy (results that concur exactly with caption goals that are provided in professional literature, such as Hicks, Hurley and McDougall, and McDougall and Hampton[55]).

Gombrich, known for his reflections on psychology and art, is quoted as considering captions to be one of the most critical variables in the understanding of pictures.[56] Researchers who have reached similar conclusions include Mehling[57] and Kerrick.[58] Also worth review in this context is the work of Dwyer (as above).

Details of effective (and ineffective) use of captions and headlines relative to pictures, drawn from extensive professional observation, are worked out in Hurley and McDougall,[59] McDougall and Hampton,[60] by Evans,[61] and in the literature of design by Moen,[62] Baskette, Scissors and Brooks,[63] Arnold,[64] and Garcia.[65] Review of methods recommended reveals they all concur with the empirical findings noted above.

Inter-Image Relationships ("Third Effect"):

The ability of images used in conjunction to create "third effects," that is, "a whole greater than the sum of its parts," is explored in detail (including specific functional approaches) in the professional literature cited (see especially Hicks, Hurley and McDougall, McDougall and Hampton, Finberg and Itule and Evans). This work is illuminated, confirmed and extended in psychological work beginning with the Gestalt tradition and continuing into modern work on schema and cognition.

A narrative effect is found to be especially strong, but other "third effect" possibilities are also supported by this work, including the use of words as elements within these constructions. Humor is noteworthy among these other possibilities, as is the accumulation of impact or impression (including impressions conflicting with the meaning of the photographs individually). Spatial relationships among the pictures, their relative size, and their relationship to accompanying words are identified as important variables, along with internal visual continuity or discontinuity.

An especially lucid review of the Gestalt and information theory approaches, particularly within the "legacy of the Bauhaus," is presented by Sless (with appropriate references to primary sources).[66] Twyman,[67] Maitlin[68] and Farah[69] have explored related psychological aspects of this question. Noteworthy in this context is the book Knowledge Acquisition from Text and Pictures (in which Farah's article appears) edited by Mandl and Levin.[70] A number of articles in this review of recent work consider closely related issues. See also the work of Gombrich[71] in this context (at a more general level).

Imperatives to Use:

The importance of all the work reviewed to this point (and that of the section to follow) is in two dimensions: Readership of the pictures themselves; and the influence the pictures have on reading generally.

Theory and practical observation concur: Generally pictures are "read" more than text, and pictures generally increase attention to text. Each of these points in turn may be examined on several dimensions.

These points are considered to one degree or another by all the professional literature so far cited. What can be contributed here is a review of confirming empirical studies.

Traditionally cited research includes "The Continuing Study" and reviews of that study by Woodburn, Stamm, Swanson, Sanders and Spaulding (as previously noted), Cowles,[72] and

Bain and Weaver[73] (who demonstrated the "fallout" effect of pictures in increasing readership of associated stories). More recent work confirms these early conclusions.

Meyers found high readership and reader satisfaction (relative to text) for sensitively used pictures.[74]

Bohle and Garcia found photos were consistently in the first items noted in 15 experimental pages, even in competition with strong color elements.[75]

Levie and Lentz noted consistent findings (over 135 studies) of the ability of pictures to provide for reader enjoyment, attraction of reader attention, and direction of that attention.[76]

Hartley, drawing largely on work cited in this paper, notes that unlike words, pictures are interesting "in themselves" (not merely for concepts or information conveyed), and that therefore they play a major role in attracting reader attention, and directing that attention to related words or accompanying text generally.[77]

Culbertson studied illustration in the context of textual materials with mixed results, but generally concluded that pictures could have an influence on the perception readers held of associated copy.[78]

The best (that is, the most specific) recent empirical study is that of Baxter, et al. Their design involved taking a newspaper front page which originally included a large photograph and experimentally reducing it (in one case) or eliminating it (in another case). Interviews explored the recall of both primary and secondary elements of related stories. The study clearly establishes experimentally the strong effects of photos and their size on readership of stories, and this study, as noted, has been cited in the psychological literature.

Duchastle (cited in Sless) also found a positive picture-to-text fallout effect experimentally.[79] Wolf and Grotta found that certain types of pictures appeared to have greater impact on recall of details in associated stories,[80] a finding that concurs precisely with psychological work by Evans and Duffy who showed that the "emotionality of pictures influenced recall of related and unrelated phrases."[81]

A study by Peterson demonstrated increased reader acceptance and approval for experimental front page designs when pictures were included.[82]

Selection and Cropping:

Between the lines of these empirical studies lies an issue made explicit (but only intuitively and anecdotally explained) in the literature of professional experience. That is the question of what kind of picture (in what format) can be expected to most effectively enlist the benefits enumerated so far?

The literature of professional experience identifies two closely related issues: Selection of the specific photos to be used from those available; and selection of the specific portion of that photo to be presented. This latter decision is referred to professionally by the term "cropping" and relates to the process of removing from the final presentation those portions of an original image thought to be less effective, and to creating a more striking or useful shape. The issues involved in cropping have been treated extensively in professional literature (often citing concepts drawn originally from Gestalt psychology). Other than to observe on the obvious importance of cropping as a factor in the attentional role of photographs as discussed above, there appears to be little new for this paper to report. Hurley and McDougall, McDougall and Hampton, Finberg and Itule and Evans all present well considered and illustrated discussions of cropping, as do a number of other popular texts (see especially Kobre and Hoy).[83]

The question of shape as a function of visual impact is also considered in the professional literature of both communications photography and design and in the literature of Gestalt psychology (especially as it relates to art, as noted above). A thorough consideration of this question seems beyond the scope of this paper, but becomes important to questions of design and position.

There have been several approaches to the question of "which picture is most likely to be effective" in terms of reader response.

Most early studies (as Cowles, and the Continuing Study of Newspaper Reading -- and its several reviewers, as cited above -- plus work by MacLean and Kao,[84] MacLean and Hazzard[85] and by Hazzard[86] and even recent work by Geraci[87]) have concentrated on evaluation of photographs by content, that is, by news or human-interest category (often using lists similar to or derived from the "Deutschmann" categories).

Professional experience (as reported for instance by Hurley and McDougall,[88] Evans[89] and Hicks[90]) suggests another approach, and a growing body of empirical literature is lending support to this new view.

This new approach is to look at photographs by photographic (rather than news category) type.

Evans particularly has suggested that photographs be evaluated on the basis of such questions as "animation", "context", and "depth of meaning".[91] Kobre has examined attempts to rate pictures on such dimensions as news value of the event, notoriety of subject, action and "eye-stopping appeal" and concluded that these attempts have not been successful because these elements are too difficult to consistently define operationally and to quantify.[92] One must also consider questions of definition.

MacLean found (in the "Badger Village" study) that the use of photographs themselves could provide a vehicle for improving editors' ability to relate readers' interest in pictures, but has also noted that most editors must "fly by the seat of their pants" in picture selection.[93] .

Several recent studies have taken this direction further. The Evans and Denny study cited above used photographs carefully graded for their emotional appeal and studied their impact on caption recollection with notable results (showing in the process that operational definition is possible).[94]

Wolf and Grotta, also cited above, have contributed an exploratory examination of Evans categorization in an experimental study, testing the "animation" dimension with mixed but generally positive results. Their experimental design compared recall of a story about a woman dancer when it was associated with an "animated" picture of her (dancing) and when it was associated with a portrait of her appearing in otherwise identical experimental newspaper pages. Definition remains crude and intuitive, but successfully predicts outcome.[95]

The use of the portrait as a comparison in this exploration yields a bit of possibly unexpected insight, because it is typical of a type of photograph widely used in publications, especially in newspapers such as USA TODAY and others whose design has been influenced by that newspaper.

Peterson et al. have explored the distinction made by Wolf and Grotta, further generalizing the concept by distinguishing among "portrait", "documentary" and "other" pictures.[96] This small-scale content analysis, also exploratory, demonstrates the conceptual validity of the items themselves and shows that such categorization successfully distinguishes between newspapers having observable differences in approach to picture use. Specifically, this technique successfully identified newspapers whose picture use varied significantly from the standards of this canon, where the more traditional efforts of Geraci did not.

Finally, in a pilot study, using survey methods, Peterson has shown that this method of categorization may be more effective than the traditional news category method in predicting reader response to photographs.[97]

Conclusions:

Clearly, on the grounds of both professional experience and empirical research, we may conclude that the use of pictures, their size, position (both relative to type and overall page design and relative to each other), their color and associated words can be substantial, in some cases perhaps decisive, motivational factors in reader attention (both to a publication generally and to associated stories), appreciation and approval of printed communication (newspapers particularly, but also magazines and textbooks).

What has been established so far is intended as a model (with that term used in the scientific sense) or canon (that is, a body of generally accepted principles, standards and norms) that reflects empirically validated practice relating to the use of still photographs in publications (especially newspapers). These principles (or the elements of this model) indicate predictable communication effects in such interrelated dimensions as selection (and cropping), size, position and color, and the relationship between images, and between images and associated words, and relates these dimensions to readership outcome, but does not provide detailed instructions. Specific concerns with size, position and readership lock this discussion into broader discussion of newspaper design (and publication design generally).

What emerges from this model and from recent research is the need for further research directed to clarifying the remaining but difficult aspects of picture use such as position and selection.

Selection, what type of picture is likely to prove most effective in terms of reader interest and satisfaction, is probably the key issue identified by this model for mass media research, and a new approach to the definition of picture type may offer a fruitful approach.

Progress in cognitive psychology suggests it may be possible now to explore as well the specifics of the "third effect" phenomenon and of position questions.

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The Computerization of Television Newsrooms:

A Case Study

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The Computerization of Television Newsrooms:
A Case Study

In an era of microchips, random access memories and digital downloads, quiet computer keyboards are gradually replacing the anachronistic cacophony of clacking typewriters in many television newsrooms. While video display terminals (VDT's) are commonplace in most newspaper newsrooms (Lindley, 1988), computer terminals have only recently invaded the broadcast newsroom (Yoakam & Cremer, 1985).

In their few short years in most television newsrooms, computers have revolutionized the way many broadcast journalists do their jobs yet very little apparently is known about the impact of the computer on the electronic newsgathering process. A review of the literature found no scholarly studies that have investigated the effect of computers in television news.

Because computer technology has become an important step in the dissemination of electronic news, the purpose of this study is to 1) briefly examine the development and effects of electronics and computers in the news gathering process, 2) discuss the basic structure and functions of television news computer systems, and 3) measure the attitudes toward and effects of computers at one fully computerized television newsroom, WFAA-TV in Dallas. This descriptive case study then, provides a preliminary overview and analysis of the development, attitudes toward, and usage of computers in television newsgathering.

I. Review of the Literature

Electronic technology has been used to produce the news since the first telegraph messages in the 1840s. Later, teletypes received printed copy and photographs via wire (Lindley 1988; Moghdam 1978). But 1920 brought the debut of a much more technologically sophisticated way to disseminate information: radio. WWJ radio in Detroit (owned by the Detroit News) and Pittsburgh's KDKA radio broadcast the Harding-Cox presidential election returns and "news" was never the same (Gross, 1988 chap. 2). Eventually, the relatively simple electronic technology that served newspapers (wire services) began serving broadcasters. In 1932 the Associated Press sold presidential election bulletins to the networks and entertainment programs were interrupted with news bulletins (Gross 1988, ch. 2). Within a few years, the radio networks began their own newsgathering activities. By the 1950s television began electronically reporting the news.

Television electronically _gathered_ and _disseminated_ the news, but it was newspapers that first used electronics to _produce_ the news. The 1948 invention of the transistor and the eventual miniaturization of data processing equipment led newspaper researchers to develop a fully electronic newspaper newsroom in 1967 (Lindley 1988). The first computer installation at a newspaper came in 1973 at the _Detroit Free Press_ (Francke & Anderson 1980; Lindley, 1988).

But broadcast news didn't begin using computers until seven years later. In 1980, the newly created Cable News Network became the first television news network to install a newsroom computer system (Basys, Inc., 1990). The first local television station to computerize its newsroom was KRON in San Francisco in 1982.

Basys Inc. was among the first companies to design and market a computer system strictly for broadcast newsrooms. Founded in the late 1970s, Basys installed the systems at both CNN and KRON. One of the company's major clients, International Television News in London, purchased Basys in 1984. Today, with corporate headquarters in Slough, England, Basys is the largest manufacturer of television newsroom computer systems world-wide (Basys, 1985). Basys' closest competitor is Dynatech Newstar. Other major manufacturers include Data Center Management of Charlotte, North Carolina, and Media Computing of Phoenix, Arizona.

As discussed previously, published literature on the effects of computers in television newsrooms is scarce. However, one study cited in a Basys brochure described a survey conducted at the University of Iowa that studied 15 broadcast organizations with newsroom computer systems. Results indicated that a vast majority of respondents agreed or strongly agreed that 1) the system makes communication in the newsroom easier, 2) more editing is done on copy, 3) the system makes last minute changes easier, 4) the computer saves time, 5) copy is prepared faster, 6) stories are better researched, and 7) the system makes editors more responsive to breaking news (Basys, 1985).

According to Wolfe (1986), after a radio news director installed a Basys system in his newsroom, he concluded that computers are the future of broadcast news. "It is no longer a question of _if_ your newsroom will computerize, just a question of _when_ it will happen" (p. 3). Wolfe also predicted that news employees would never want to return to manual typewriters once a computer system is installed in a broadcast newsroom.

Related Studies

A review of the literature concerning computers in newspaper newsrooms provides several useful perspectives that are likely to be found in computerized television newsrooms.

A survey of copy desk editors at 127 daily U.S. newspapers found that editors responded positively to electronic news editing. They said that VDT's made editing faster, cleaner, and gave them more control over the product. The editors also said VDT's made copy more polished and readable with fewer errors. The respondents also said that VDT's have de-personalized copy editing and required editors to have a higher level of skill than editing on paper (Lindley, 1988).

A study of 42 newspaper copy editors who had used VDT's at least two years found that VDT editing was slower, but more accurate than editing on paper (Shipley & Gentry, 1981).

Francke and Anderson (1980) surveyed newsroom employees at the Orlando (Florida) _Sentinal Star_ before and after conversion to VDT's and found that respondents believed computers helped them work faster and easier but didn't make their work any more accurate. Newsroom workers also reported eye strain and headaches after the conversion to computers.

Kerr and Niebauer (1987) studied the database retrieval use of 40 writers at U.S. newspapers that had computerized newsrooms. They found that 68% of the respondents said they seldom or never retrieved data for use in their stories apparently because they didn't have the time to do adequate research

A similar study of staff members of a large metropolitan daily newspaper that had a recently installed an electronic library system found that 84% of the news staff used the new library to retrieve previously published stories. While that percentage appears to be high, the authors found that more staff members were using manual clip files to retrieve archived stories prior to computer conversion (Ward, Hansen, & McLeod, 1988).

Computerization of the newsroom has been shown to produce anxiety among some staff members. After reviewing the literature, Shipman (1986) concluded that newspaper managers should carefully plan computerization efforts, and allow employees to participate more frequently during the planning stages.

Gardner, Young and Ruth (1989) surveyed 378 managerial and professional workers in the Washington, D.C. area who used computers and found that people are becoming more accustomed to computers. The authors concluded that the factors influencing positive attitudes toward computers were pleasure and quality of life. Fear and anxiety were less important in determining respondent's attitudes toward computers.

Several health aspects concerning VDT's and computers have been raised over the years. A phenomonen known as repetitive strain injury (RSI) is afflicting many newsroom employees. The term encompasses many painful and often debilitating afflictions involving the hands, arms or shoulders. More and more journalists and office workers who strike a VDT keyboard thousands of times a day are developing RSI (Hembree & Henry, 1987; Stein, 1989). Federal legislation that would require employers to provide safer work environments for VDT workers is under consideration. Some states have already created VDT regulation laws (Reynolds, 1989; Sneed 1985).

II. Structure of Television Newsroom Computers

Television newsroom computers perform a variety of functions. Primary functions include archiving (filing and categorizing scripts and video tapes), operations (receiving and filing wire stories, planning and organizing daily news coverage), writing and editing (basic word-processing functions), and producing (assembling and ordering the producer's rundown-- the order of content for a news program) (Yoakam & Cremer, 1985, chap. 12). A typical computer system can also automate many routine news functions such as the teleprompter, the character generator, still store machines, close captioning, election returns, school closings, sports scoreboards, personnel scheduling, electronic mail, and personal files. Certain systems can even be linked to robotic cameras in the studio allowing a newscast director to program camera shots for an entire newscast prior to broadcast. Some systems allows users to program video tape machines in a similar fashion (Basys, 1990; Data Center Management 1990; Dynatech Newstar 1988).

Hardware

Depending upon the system manufacturer, hardware consists of either a mainframe computer with "dumb terminals" or strictly "intelligent" microcomputers (IBM-compatible), or a combination of both dumb and intelligent terminals.

Systems can range in size from one terminal or PC to 1000 terminals (Basys Inc., 1988). In a medium to large newsroom, Basys, Data Center Management, and Dynatech Newstar systems use redundant mainframe "computer control units" (CCU's). In larger newsrooms, managers, producers, reporters, writers, directors, assignment editors, video tape editors, photographers, production and promotion personnel and others can access the mainframe through a private password entry system. Users can interact with one another via electronic mail (Basys, 1990; Data Center Management 1990; Dynatech Newstar 1988).

Modems allow newsrooms to access numerous databases outside the station and provide instant access to network information about news programming and, of course, the major wire services (e.g., AP and UPI).

Printers equipped to handle multi-part script papers allow users to print large-point scripts on demand. Users can print stories found on wire services on standard dot-matrix printers. Specialized hardware also enables users to operate electronic teleprompters for use in the studio.

Smaller newsrooms with systems such as those marketed by Media Computing use IBM compatible terminals to perform functions similar to those described above. (Media Computing, Inc. 1989).

Software

The mainframe computer systems rely on multiple hard disks for data storage. PC-driven systems can use hard or floppy disks. Available software can sort and automatically categorize incoming wire stories and alert the staff of breaking stories or preselected stories within certain categories; provide specialized word-processing functions for broadcast news; create an archive system to store previous stories and background information (stories can be found by commanding the computer to search for one or more specific keywords); time, order and arrange newscast rundowns; and provide a continuous directory of story assignments, coverage status and available personnel. Specialized software packages provide templates for creating and archiving school closing lists, sports scores, election returns or close-captioning. Information from these software programs can then be sent directly to a character generator or encoder for use on the air (Basys, 1990; Data Center Management 1990; Dynatech Newstar 1988).

The rapidly developing newsroom computer industry is constantly providing users with new software applications and updated technology that is changing the way broadcast journalists do their jobs.

III. Attitudes Toward and Effects of Television Newsroom Computers

To provide preliminary data on the effects of the computer in television newsrooms, this case study examines one newsroom that has been fully computerized since 1983: WFAA-TV in Dallas, Texas. WFAA has been a consistent ratings leader and national award winner in a very competitive news market (ADI no. 7). It was the first station in the market to computerize its newsroom, and became one of the first computerized television news operations in the country. The station uses a Basys computer system. Approximately 100 employees (users) have access to the system in the station's main studios in Dallas, and in its bureaus in Fort Worth, Austin, and Washington, D.C. As illustrated in Figure 1, WFAA's system runs on two MicroVax II computers built by Digital Equipment Corporation. The redundant system in Dallas is capable of supporting 80 devices (i.e. terminals, printers, modems, wire services, etc.). A remote extension of the main computer in Fort worth can support up to eight devices. Terminals and printers are also located in the Austin and Washington, D.C. bureaus. WFAA uses five wire services. The system uses three modems for users to call in and one modem for outgoing communication. This enables users to access the newsroom computer from their home or some other location. The system also uses five printers. Another CCU is available for use in the station's satellite remote truck. Computerized teleprompter hardware is also attached to terminals in the Dallas studios and in the Fort Worth bureau (W. Zwirko, personal communication, April 3, 1990).

Insert Figure 1 about here

Research Questions

Based on the literature, and the author's own experience in the WFAA-TV newsroom as a former employee, this case study is guided by three research questions. 1) What computer functions do users say are the most important for their job? 2) What factors influence attitudes toward computers (i.e. enjoyment, training, quality of life, fear, and anxiety)? and 3) Do users report any physical discomfort associated with computer use?

Methodology

A questionnaire was distributed by the newsroom computer system manager in March of 1990 to 100 users of the WFAA-TV computer system in Dallas. Users in Fort Worth, Austin and Washington D.C. received questionnaires in the mail. During a three-week period, whenever users logged on to the system a message reminded them to complete and return the questionnaire. To prevent extinction, the message wording was changed every few days.

To determine what computer functions users considered the most important respondents were asked to rate 13 computer functions on a five-point scale from "least important" to "most important."

To measure attitudes toward the newsroom computer system, users were asked to rate their agreement with 20 positive and negative statements concerning factors influencing computer usage. A five-point scale ranging from "strongly disagree" to "strongly agree" was used. Many statements were modified versions of those used by Gardner, Young and Ruth (1989) in their examination of the evolution of attitudes toward computers. Additional statements were modified from a study of newspaper VDT's by Lindley (1988). Statements were designed to analyze attitudes in the following three categories: enjoyment, quality of life and work, and fear and anxiety. A fourth group of statements concerned attitudes toward computer training.

Respondents were also asked how many hours a day they used the computer system, what they did if they needed help with the computer, and whether they owned a personal computer and modem.

The questionaire also listed five physical ailments commonly associated with VDT use: headaches, blurred vision, aches or soreness in hands/wrists, neckache, and backache. Users were instructed to respond on a five-point scale from "never" to "always" how often they experienced physical discomfort associated with VDT use.

Demographic information was collected concerning age, education, gender, primary job area and length of time in career.

Finally, an open-ended question asked respondents what they thought was the system's greatest advantage and greatest disadvantage.

Results

Despite the log-on messages reminding respondents to complete their survey, only 38 of the 100 computer users returned the survey. Of the 38 respondents, slightly more than half (53%) were male, The average age was 35-49 years; 29 (76%) had undergraduate degrees. All but one respondent worked in the newsroom. Surveys were distributed to other departments that had access to the newsroom (production and promotions) but only one survey was returned from the promotion department and none from production. Twenty-nine percent (11) of the respondents were reporters. Six (16%) were managers, 6 (16%) were producers, 5 (13%) were photographers. Two respondents were anchors (5%) and 2 (5%) were video tape editors. One respondent was a writer. The remainder of the respondents (5) did not specify a job title.

More than half (55%) of the respondents had worked for the station six years or less. Because the computer system was installed in 1983, this meant that many respondents were not employed by the station during the transition to computers. The remaining 17 respondents (45%) experienced the transition.

Nearly half of the respondents (47%) used personal computers at home. Of the 18 respondents who owned personal computers, 11 (61%) had a modem for their computer. Home computer users liked to access the newsroom computer from their homes an average of once a week, although four respondents called the computer from home every day.

Depending upon their job, some users spent a great deal of time using the computer. For example, eight percent of the respondents said they used the computer system more than eight hours a day. Most of those users were managers or producers. Another 30% indicated they used it from five to eight hours. Thirty-two percent used their computer terminals three to four hours a day. Sixteen percent logged-in for one to two hours and 13% used the computer less than one hour.

When users needed help with a problem on the computer, 50% said they tried to find the system manager. Another 28% asked a co-worker for help. Very few respondents (16%) used the computer's built-in help file.

Importance of Functions

As shown in Table 1 the mean scores concerning the importance of the 13 computer functions were rank-ordered. The basic

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Insert Table 1 about here

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function of word processing (writing stories) was ranked as the most important function. The database function was perceived as the least important function. A separate "other" category was not included on the table since only three respondents specified other functions. Those functions included "keeping names and [phone] numbers of contacts and sources," "writing promotional material," and "copy flow."

Attitudes

Users generally responded positively toward the newsroom computer system. Attitudes concerning the enjoyment of the system were highly favorable. The mean scores as shown in Table 2 indicate users were comfortable and enjoyed working with the newsroom computer and believed the computer made their jobs easier.

Insert Table 2 about here

Concerning enjoyment, 76% of WFAA staffers said they enjoyed working with their terminal. The same percentage indicated that the computer has allowed them to accomplish many job-related tasks easier.

Users did not react as enthusiastically toward their newsroom computer training. Although mean scores indicate a generally positive response concerning the adequacy and ease of training, 44% agreed or strongly agreed that they have learned only enough about the computer system to do their jobs. Fifty percent agreed or strongly agreed that they wished they knew how to operate the computer system more efficiently.

Respondents indicated that the computer made their quality of life and work better. Sixty-six percent strongly agreed that they can perform their job duties faster with a computer. The thought of life without a newsroom computer appears to be quite awful to most staffers. Eighty-six percent agreed or strongly agreed that they never want to work without a newsroom computer.

There appears to be very little fear or anxiety towards the newsroom computer system. An overwhelming majority (94%) disagreed or strongly disagreed with the statement "Sometimes I'm afraid I'll damage a computer if I use it." However, users are slightly more afraid that they'll lose what they are working on if they do something wrong on the computer. Still, 67% disagreed or strongly disagreed with that statement. No respondents agreed with the statement that computers increase the level of frustration on the job.

Attitudes of respondents who owned a home computer did not differ greatly from respondents who did not own a personal computer. As shown in Table 3, the mean scores for all attitude statements were very close. However, more non-computer owners agreed with the statement that they had learned only enough about the computer system to do their jobs.

Insert Table 3 about here

Because computer usage and demographic variables were both reported on an ordinal scale, nonparametric Kendall correlation coefficients were chosen to examine associations with attitudinal responses. As shown in Table 4, education age, and tenure had little or no correlation with attitudes. However, frequency of usage was moderately associated with some attitude responses. The amount of time spent using the system was positively correlated with agreement to the statement "I never want to work without a newsroom computer." Usage was negatively correlated with all three attitude statements concerning fear of the computer system.

Insert Table 4 about here

Physical Ailments Related to Computer Terminals

There appear to be very few health-related problems associated with the WFAA newsroom computer. A vast majority of respondents reported that they never or rarely suffered from headaches (72%), blurred vision (72%), aches or soreness in hands or wrists (77%), or backache (65%). However, some staffers reported that they did experience physical difficulties. A quarter of the users indicated they sometimes suffered from headaches. And 22% said they sometimes experienced blurred vision or backaches. It appears that the most common ailment was neckache. More than half of the respondents said they sometimes (40%) or often (11%) experienced neckaches while using or after using a computer terminal.

"Speed" was the most common answer in response to the open-ended question asking users to discuss the system's greatest advantage and disadvantage. Twelve respondents said the computer system allowed them to work faster. One respondent commented "[I] can think faster and more efficiently [to] put ideas into story form." Another respondent said "I would like a terminal that works even faster!"

The second most common advantage listed was the ability to learn what other staff members are doing. Eight respondents said they liked learning what co-workers were doing by looking at stories and other projects in progress that day, or by communicating through a form of electronic mail that flashes personal messages across the top of the terminal screen.

Efficiency was another cited advantage. Four staff members said the computer made their work more efficient. Said one: "It makes me a more efficient reporter, I love it!!" Accuracy, organization and word processing were also cited by some staff members as the greatest advantage.

The overwhelming disadvantage listed was a computer "crash." Nine respondents expressed their fear of a system failure. One newsroom manager responded, "It (the computer system) occasionally malfunctions which puts [the] newsroom-- which is completely dependent on the computer-- in a tizzy. It seems once you have it you can't work without it." A reporter wrote, "If they [computer terminals] go down no one knows quite what to do for a minute. The idea of using a typewriter is archaic!"

Three users said poor training or lack of knowledge about the computer system was the greatest disadvantage. And two respondents felt that the computer system made the newsroom impersonal. A newsroom manager wrote, "We talk on computer instead of in person."

IV. Conclusion

Most WFAA-TV newsroom computer users seem to be, by their own evaluation, computer literate and thoroughly enjoy using the newsroom computer system. This suggests that they also have very little fear or anxiety concerning the computer system which was confirmed by their attitudinal responses toward fear-related statements on the questionnaire.

The computer has made life easier for many workers despite their moderate fears concerning a system failure. This appears to be a risk worth taking in light of the many benefits listed by staffers (i.e. speed, efficiency, organization, uniformity, fewer typographical errors, inter-office communication, quality of newscasts and word-processing ease, etc.).

Despite workers' enthusiastic response to the computer, many believe they were not properly trained or have not yet learned enough about the system. This suggests two possibilities. Initially, that the system is adequately designed to accomodate even those individuals who have little knowledge about computers. The Basys system's "user friendliness" apparently allows most workers to utilize the system's basic functions with little difficulty even though users have not mastered all of the computer functions, or learned only enough about the computer to do their job. Secondly, users are perhaps more likely to accept the new computer technology because almost half of them already own home computers. In today's computerized world, television newsroom personnel cannot afford to be "what one television producer calls a 'techno-peasant'" (Yoakam & Cremer, 1985, p. 318).

Although the basic functions of a television newsroom computer system are similar to those of a newspaper newsroom system, there is more emphasis on productivity than the product itself. That is, television newsroom computer users emphasized speed more frequently than mentioning how the computer made the actual newscast look better. This could be explained by the differences in the functions of computers in newspapers and television. Newspaper editors and reporters are dealing directly with their final product as they type on a VDT. To borrow a common computer term: WYSIWYG (what you see is what you get). For television journalists, the computer is just another tool to help create the final product. Cameras are television's way of expressing the WYSIWYG concept. Pictures are the main message. Words created on VDT's supplement the pictures. So, the speed and efficiency provided by computers-- especially under the heavier demands of television deadlines-- are a premium, as opposed to the copy-editing and writing functions valued by newspaper journalists.

Also, there appears to be fewer physical complaints among WFAA workers than newspaper workers. This can again explained by the multi-dimensional nature of television newsgathering. Most television journalists, with the exception of some program producers, do not sit all day in front of a terminal as do many newspaper journalists.

Concerning the importance of specific computer functions, the database function was the rated as the least important. Workers either do not want to or cannot use the system library to locate old scripts or file video tapes. The low ranking of this function also indicates that staffers do not value the system's ability to retrieve information from databases outside their own system.

V. Discussion

This study confirms that computers have become a functional necessity in at least one television newsroom. Users value the computer as an important tool that makes their work more enjoyable and faster. This finding is not surprising because computers have permeated virtually every aspect of American society in recent years. Unlike their print counterparts in the 1970s, television news workers were more likely to adopt computers in the 1980's due to the rapid growth of the personal computer industry.

The study's major limitation is the low survey response rate (38%). However, the findings, in a preliminary sense, suggest that like newspapers, television newsrooms will rapidly adopt computer technology even in smaller markets as software and hardware costs continue to drop (Wolfe, 1986).

Structural demands indicate that computers are highly suited to meet the needs of television journalists. Instantaneous communication and editing functions allow changes in copy or the order of the newscast during the time it is on the air. Staff members learn immediately of breaking news and can respond to changes within moments. In the fast-paced world of local television news, most stations will soon have to computerize their operations just to keep up with the competition.

The findings reported here are not highly generalizable. However, they provide a useful baseline for future research into computers in television newsrooms. Future research of a broad, nationwide scope would be useful to determine exactly how many local television newsrooms have converted to computers, the effects of the conversion on workers, cost savings due to more productivity and reduced paper usage, and the computer's effect on newscast content. Although not addressed in this study, perhaps computers have had some effect on gatekeeping decisions in the newsroom. Computers automatically file and store incoming wire stories and continually notify users of "flash" stories. More research would be useful to determine how users attend to and utilize these functions when assembling the day's news.

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Figure 1
WFAA-TV Newsroom Computer System

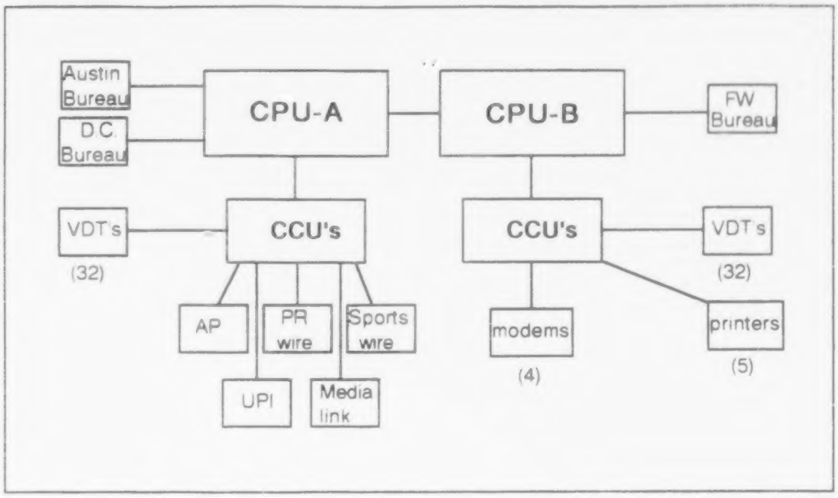
Austin Bureau
D.C. Bureau
CPU-A
CPU-B
FW Bureau
VDT's
(32)
CCU's
CCU's
VDT's
(32)
AP
PR wire
Sports wire
UPI
Media link
modems
(4)
printers
(5)

Table 1
Importance of TV Newsroom Computer Functions

Rank	**Function**	**Mean †** N=38
1.	Writing	4.54
2.	Scanning wire copy	4.38
3.	Assembling / ordering newscasts	4.24
4.	Editing copy	4.19
5.	Receiving flash alerts of urgent wire	4.08
6.	Sending /receiving messages	3.71
7.	Logging Videotape	3.65
8.	Writing / reading memos	3.57
9.	Timing/backtiming newscasts	3.54
10.	Teleprompter function	3.43*
11.	Event/Story planning	3.43
12.	Timing stories	3.11
13.	Database search	2.79

* The mode for the teleprompter function (4) was greater than the mode for the event story planning function (3).

† 1 = Least important. 5= Most important

Table 2
Mean Scores of Attitudes toward TV Newsroom Computers

	MEAN † N=38
ENJOYMENT	
I enjoy working with my computer terminal.	4.71
I enjoyed the challenge of learning to use the computer.	3.95
Since learning to use the newsroom computer, there are many tasks which I can accomplish easier.	4.77
I can do my job very well without computers.	2.27
I feel comfortable using the computer system's various functions.	3.92
TRAINING	
I was adequately trained to use the computer system.	3.17
It was easy to learn how to use the computer system.	3.44
I have not mastered all of the computer functions.	3.60
I have learned only enough about the computer system to do my job.	3.03
I wish I knew how to operate the computer system more efficiently.	3.37
QUALITY	
The computer system helps me make decisions more easily and effectively.	3.76
I make fewer typographical errors on the computer.	3.68
It is easier to find factual or grammatical errors in stories written on the computer system.	3.90
I can perform my job duties faster on the computer.	4.58
I never want to work without a newsroom computer.	4.43
The newsroom computer contributes greatly to the overall quality of our newscasts.	4.50
The newsroom computer allows me to spend more time performing other job duties.	3.84
FEAR AND ANXIETY	
Sometimes I'm afraid I'll damage a computer if I use it.	1.47
Sometimes I'm afraid I'll lose what I'm working on if I do something wrong on the computer.	2.32
I sense that computers increase the level of frustration in my job.	1.50

† 1 = strongly disagree, 5= strongly agree

Table 3
Mean Scores of Attitudes of Computer owners vs. Non-Computer Owners

	COMPUTER OWNERS N=18	NON-COMPUTER OWNERS N=20
ENJOYMENT		
I enjoy working with my computer terminal.	4.79	4.65
I enjoyed the challenge of learning to use the computer.	4.06	3.85
Since learning to use the newsroom computer, there are many tasks which I can accomplish easier.	4.72	4.80
I can do my job very well without computers.	2.24	2.30
I feel comfortable using the computer system's various functions.	3.94	3.90
TRAINING		
I was adequately trained to use the computer system.	3.39	2.94
It was easy to learn how to use the computer system.	3.44	3.44
I have not mastered all of the computer functions.	3.33	3.85
I have learned only enough about the computer system to do my job.	2.50	3.53
I wish I knew how to operate the computer system more efficiently.	3.00	3.70
QUALITY		
The computer system helps me make decisions more easily and effectively.	3.94	3.60
I make fewer typographical errors on the computer.	3.72	3.65
It is easier to find factual or grammatical errors in stories written on the computer system.	3.89	3.90
I can perform my job duties faster on the computer.	4.56	4.60
I never want to work without a newsroom computer.	4.61	4.26
The newsroom computer contributes greatly to the overall quality of our newscasts.	4.50	4.50
The newsroom computer allows me to spend more time performing other job duties.	3.89	3.80
FEAR AND ANXIETY		
Sometimes I'm afraid I'll damage a computer if I use it.	1.44	1.50
Sometimes I'm afraid I'll lose what I'm working on if I do something wrong on the computer.	2.22	2.40
I sense that computers increase the level of frustration in my job.	1.33	1.65

† 1 = strongly disagree, 5= strongly agree

Table 4
Kendall (Tau) Correlation Coefficients: Usage and Demographic Associations with Attitudes toward TV Newsroom Computers*

	Frequency of use	Education	Age	Tenure
ENJOYMENT				
I enjoy working with my computer terminal.	.397	.015	.172	.035
I enjoyed the challenge of learning to use the computer.	.251	-.206	.126	.118
Since learning to use the newsroom computer, there are many tasks which I can accomplish easier.	.397	.011	.155	.003
I can do my job very well without computers.	.281	-.149	.085	.128
I feel comfortable using the computer system's various functions.	.035	-.072	-.313	-.238
TRAINING				
I was adequately trained to use the computer system.	-.197	.256	-.258	-.107
It was easy to learn how to use the computer system.	-.326	.103	-.22	.165
I have not mastered all of the computer functions.	-.047	-.081	.39	.325
I have learned only enough about the computer system to do my job.	.217	-.201	.316	.273
I wish I knew how to operate the computer system more efficiently.	-.047	-.079	.311	.171
QUALITY				
The computer system helps me make decisions more easily and effectively.	-.035	.107	-.066	-.05
I make fewer typographical errors on the computer.	-.086	.113	.168	.142
It is easier to find factual or grammatical errors in stories written on the computer system.	.135	.139	.042	-.057
I can perform my job duties faster on the computer.	.108	-.19	.035	-.161
I never want to work without a newsroom computer.	.413	-.006	-.111	-.179
The newsroom computer contributes greatly to the overall quality of our newscasts.	.354	-.052	-.155	-.352
The newsroom computer allows me to spend more time performing other job duties.	-.11	-.06	.168	.198
FEAR AND ANXIETY				
Sometimes I'm afraid I'll damage a computer if I use it.	-.565	.12	.126	.244
Sometimes I'm afraid I'll lose what I'm working on if I do something wrong on the computer.	-.439	.196	.228	.111
I sense that computers increase the level of frustration in my job.	-.46	.174	.107	.078

* $p < .05$.

Facsimile Newspapers - A Changing Medium in a Changing Market

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Facsimile Newspapers

Among the 'new' technologies of the 1980s, few caught on with the speed of the facsimile machine. Combining the quickness of the telephone with the convenience of the photo copying machine, fax made it possible to send copies of documents worldwide all but instantly.[1]

In 1988, 500,000 facsimile units had been sold and sales of a million were expected in 1989.[2] Predictions were that the number of fax machines in use would be close to 20 million by the mid-1990s.[3]

The sudden emergence of this technology was not lost on the newspaper industry, which was going through a difficult time. In 1989, market penetration was down to the point where only one family in two was regularly buying a newspaper. [4]

Some 12 newspapers and one private firm have attempted to offer various forms of facsimile newspapers in the past two years. The papers take a variety of forms, serve a variety of audiences, and have met with varied success. They are not the first facsimile transmissions, however.

The four stages of facsimile

A computer magazine says Scottish psychologist and author Alexander Bain first proposed the idea of transmitting pictures through wire from one location to another in 1842, and the first working facsimile machine appeared in 1854. [5]

Editor and Publisher says one of the early stages was in 1907, when "a contraption invented by a Prof. Korn of Munich was used to transmit a picture of the president of France 640 miles from Paris to Lyons. The German inventor said he had already received several orders from large newspapers, and 'some from the police.' In the same year, newspaper wire photos were sent across the English channel."[6]

The second stage began, according to the broadcast historian Erik Barnouw, "at a 1923 luncheon of General Electric engineers. Owen D. Young said, according to the recollection of Ernst F. W. Alexanderson: 'I'm getting tired of dots and dashes. Why don't you just make a system so you can put in a written letter and zip -- it will come out just as it is written at the other end.'

The engineers smiled; Young liked to make suggestions, without any notion of what was involved."[7]

But the transmission of documents and pictures in "facsimile" by the scanning method became a reality within months. In July 1924 RCA was sending a "radio photo" of Charles Evans Hughes across the Atlantic; the idea of a radio newspaper, a "facsimile newspaper," began to be discussed. [8]

On June, 1937, Editor and Publisher printed the first "telephonically transmitted" color photo used in a regular periodical. It was a picture of a bright red parrot, and was transmitted from Chicago to New York in eight minutes on a system developed by radio engineer William Finch. Some of the experimenting at this time was in anticipation of the 1940 Olympics. [9]

By 1938, Barnouw reported "38 short wave stations, privately owned, were beaming programs throughout the world and commercial sponsorship was expected to be authorized by the FCC.

"A number of companies were experimenting with facsimile broadcast -- newspapers (complete with pictures) sent by radio and received by special facsimile receivers, which listeners kept supplied with paper. Some stations were transmitting such newspapers at night over their regular frequencies: the listener found his newspaper by his set in the morning. A Crosby facsimile receiver went on sale in 1938 at $79.50.

"The New York Times on January 23, 1938 said the stations known to be engaged in facsimile broadcasting included KSD, St.Louis; WGN, Chicago; WSM, Nashville; WOR, Newark; WHO, Des Moines; WGH, Newport News; KFBK, Sacramento, and KMJ, Fresno.[10]

The third stage developed after World War II, when the Miami Herald began transmitting fax editions over a local FM station, the Philadelphia Inquirer had a weekly fax edition and the University of Missouri School of Journalism ran a five day publication called Missouri Fax.

The Miami experiment lasted about a year, and was abandoned because of cost, lack of market, and the advent of television, author/editor Lee Hills said.[11]

The modern fax machine

The current stage rides the crest of further electronic and especially digital development, which makes speed and compression of information possible. In newspapers, this fourth wave started in April, 1989, when the Hartford Courant launched its afternoon FaxPaper. Conditions were greatly different from those of the first three stages.

The electronic and the business worlds were much more advanced than in the 30s and late 40s. Technology had developed to the stage where fax machines could transmit characters as well as dots, operate at high speeds, and offer resolutions of up to 400 lines per inch, transmitting at 600 characters per second.[12]

Fax machines operate in the following sequence: a page of information is inserted into the sending machine, and the number of the receiving machine is dialed. The sending machine pulls the paper into it, scans the message, and makes it into digital signals. These signals are sent over ordinary phone lines to the receiving machine, which decodes the message and prints it out. [13]

Facsimile was enhanced by its connection to personal computers. Users of the Macintosh computer could connect directly to a fax machine, thus speeding output.[14]

A similar system costing $395 was available for other computers. [15]

The increase in cost of courier services and concerns about higher postal rates led other businesses and publishers to consider facsimile. [16]

Despite the widespread acceptance of facsimile by businesses, efforts to predict when large numbers of fax machines would be in the home were difficult at best.

In the business world, hotels became major users of fax services to assist their clients, followed by quick print shops, and soon, libraries and courthouses. Predictions were that the number of fax machines in use would be close to 20 million by the mid-1990s.[17]

Commercial uses of fax machines were incredibly varied. Facsimile machines were being used by pharmacies, nursing homes, delicatessens, truck plazas, dating services, fishermen seeking weather information, CBS sports announcer John Madden in his cross-country bus, the military, K mart, psychics offering advice, police with arrest warrants, real estate agents, newspapers with letters to the editor, William F. Buckley on his world tour, radio stations with music requests and the United States and Soviet governments.

The US-USSR "hot line" between presidents is actually messages transmitted by computer from the US to the Soviet Union and printed out at 1,800 words per minute. Voice conversations are considered more likely to be misunderstood or mistranslated, a Pentagon spokesman said.[18]

Newspapers were looking into fax for many reasons, which will be discussed, a primary one being they could get into facsimile transmission "without a lot of overhead," according to Dennis Schain, public relations manager of the Hartford FaxPaper. The equipment was straightforward, the customers had their own receiving equipment, and plain paper printouts could be prepared quickly and easily in a newsroom.[19]

Nature of the study

In 1990, a number of notices appeared in the trade press about papers starting up facsimile newspapers. It was decided to analyze these papers in terms of size, content, and nature.

Each of the papers mentioned in trade press articles was contacted, and all agreed to participate. The number of papers was 12, including all of the papers known to be publishing fax papers in the United States at the time. At least four of the papers were faxed to the author. All of the fax papers were started in late 1989 or during 1990. Most of the issues studied were distributed during April and March of 1990, some later that year.

The papers represented, and the name of their facsimile newspaper, were as follows: Aberdeen, S.D. American News, a member of the Knight-Ridder chain; EDNFax, Effingham, Ill., owned by the independent Effingham Daily News; Los Angeles Times NewsFax, prepared in Los Angeles but distributed only in Moscow, USSR; the New York Times TimesFax, prepared in New York and distributed in Tokyo; the Toronto Globe and Mail (Thomson Newspapers) FAXsummary, distributed in Canada and to Canadian embassies and government installations worldwide; the Minneapolis Star-Tribune Executive Fax; the Hartford Courant FaxPaper, owned by that Times-Mirror paper; the St. Paul PioneerPressDispatch NewsFax and the Journal of Commerce Oil Price FasFax. Aberdeen, St. Paul and the Journal of Commerce are owned by Knight-Ridder, but there is no evidence the fax papers are coordinated or that there is any cooperative involvement.

The private enterprise not owned by a newspaper had two outlets, the Effingham and Bloomington, Ill., Fax Today. Two papers which started fax newspapers but stopped them during the time of this study were also included. These were the the Chicago Tribune TribFax, which ceased operation after four months on Aug. 17, 1990; [20] and The Knoxville (Tenn.) NewsFax, which ceased operation in the fall of 1990.[21]

USAToday test marketed a business-oriented facsimile newspaper for a time in 1990 but did not continue it, [22] and at least three papers were shipping fax newspapers to the U.S military forces in Saudi Arabia under Operation Desert Shield. They were USA Today, the New York Times and St. Paul Pioneer Press.[23]

Analysis was made in terms of number of pages, stories per page, columns per page, page size, column width, words per story, words per line, lines per story, percent of paper related to business, and percent of space devoted to advertising.

It should be mentioned that it is impossible at this time to make global predictions on the future of facsimile newspapers, even though all fax papers believed to be published in the United States during this time period were included in the study. Certain information was not available, especially proprietary business information which might have had competitive considerations.

The study will also show that very little in terms of resources was applied to this wave of facsimile newspapers. The computers were already in place, and with a few exceptions, only a very small allocation of human resources was needed.

At this stage, projections of the future of fax were not possible. The fact that Chicago, Minneapolis and Knoxville ceased publication during the time of this study is an indication that there were difficulties in some situations. Others, without revealing financial information, maintained that their operation was "very successful" and would continue for the foreseeable future.

The results are as follows.

Nature of the papers: Facsimile newspapers in the United States and Canada in 1990 are a varied and specialized lot, designed to serve local or special market niches as seen by the paper.

Eight of the 12 are what could be considered "standard," which is to say one-page newsletters, with short news stories, mostly without ads. These are designed to provide "Tomorrow's News Today" as is stated on the flag of the Aberdeen and St. Paul newspapers. The stories are short, the coverage is varied, and three of this group carried one or more small ads.

The Journal of Commerce Oil Price FasFax included only oil prices, primarily fuel oil, and gasoline prices. Two pages of ads for merchants include prices of the products they sell. This paper was not included in most of the analyses which follow. The Journal of Commerce had earlier tried a more broad-based general business news publication, but decided to focus on the specialized oil price publication.[24]

The New York Times and Los Angeles Times provided more extensive news for diplomats and businessmen in two major foreign capitals. The New York Times sent its six-page paper to Tokyo, primarily for business officials and tourists. The Los Angeles Times distributed its eight-page paper in Moscow, primarily for U.S. and Soviet government officials. [25]

These two facsimile papers were included in the analyses, with care made to separate them from the one-page localized newsletters as appropriate. The Toronto Globe and Mail paper, also distributed world-wide to more than 130 Canadian embassies and government installations was four pages, but like the one-page papers in content and purpose.

Circulation of parent papers: A standard comparative measure in newspaper studies is circulation. The total circulation of the 11 papers which had fax newspapers (not the circulation of the fax papers themselves) was 4,179,072, or an average circulation of 379,642. Of those dailies, four were less than 100,000 circulation; five were between 100,000 and 1 million; and two were more than 1 million.

Eight of the papers circulated on Sunday with a total circulation of 5,309,478 or an average of 663,684. On Sunday, one paper was less than 100,000, four were between 100,000 and 1 million, and three were more than a million in circulation. [26] Effingham-Bloomington was not included in this category, since the fax papers were not run by the local newspaper in the community.

The descriptive statistics on the facsimile newspapers themselves are as follows, based on one or two random issues of each publication: (Table 1 about here)

Number of pages: Eight of the papers had one page. Two had four pages, one each had six and eight pages.

Page size: Page size was dictated by needs of the facsimile equipment. Five of the papers fit the 8 1/2 by 11 format, six the 8 1/2 by 14 format and Effingham FaxToday ran 8 1/2 by 18 inches. If there were an average size, it would be just under 8 by 14 inches.

Column width: Those papers with two column formats averaged 21.6 picas per column. Those with three columns averaged 13.8 picas per column, and the four column Minneapolis paper was 12.5 picas per column.

Columns per page: Given that all papers were working with a page eight to eight and one-half inches wide, the number of columns was surprisingly varied. It averaged 2.7 columns per page, with seven papers running two columns; New York, Chicago and Toronto papers running three columns; Minneapolis having a four column page and Los Angeles and Effingham EDNFax having both two and three column formats in the same paper.

Words per story: It should be pointed out that 'story' as used in this context is not similar to a standard newspaper story. Perhaps 'item' might be a more appropriate word.

This category was skewed by the much longer stories distributed by the Los Angeles Times and the New York Times. When these two papers were included, the average was 99.25 words per story. Without these two papers, the average was 57.6 words per story.

Words per line: The stories averaged 8.4 words per line (some line lengths varied) and 7.02 lines per story.

Deadlines: Some of the deadlines were not listed on the fax papers, but noon and 4:30 p.m. were the two most commonly mentioned deadlines. Bloomington and Effingham had noon deadlines to help serve the luncheon crowd. Chicago, Knoxville and Hartford listed 4:30 deadlines.

Advertisements: Four of the 11 papers ran ads, with Bloomington and Effingham running the most ads. They were not associated with a newspaper, and thus were not in it to provide an additional service to readers or to protect their market. Bloomington averaged eight column inches of ads on a 26-column inch page, and Effingham had 17 column inches of ads on a 28-column inch page.

Stock market summaries: All of the papers except Aberdeen had a stock market closing summary in one form on another. Most were brief items, carrying only the main notices. Minneapolis devoted one of its four columns to summaries of national and regional stock markets.

Story categories: (Table 2 about here)

Not surprisingly, since most fax machines are located in businesses, the largest single category was business news. In all, 37.9 per cent of all stories were business related. National and international stories were second and third with 22.4 and 21.3 per cent of the stories, and local state and sports categories averaged about six per cent of the newshole.

Costs of fax papers: Because the papers were experimental, many of the fax papers were distributed for free. Those were Aberdeen, Effingham-Bloomington FaxToday; Effingham EDNFax; The Los Angeles Times Moscow edition; and Knoxville.[27] Other costs to receive fax papers, as of November, 1990, were $100 for six months in St. Paul, with "Copy NewsFax as much as you want" on the bottom of the page; $250 per year for Executive NewsFax in Minneapolis; $600 per year in Hartford; $495 for six months of the Journal of Commerce Oil and Gas Fax paper; and a sliding scale for the TimesFax Tokyo edition, based on number of copies distributed, starting with the top rate of 240,000 yen per year (about $1860 based on a November, 1990 rate of 129 yen to the dollar).[28]

Information not available: For competitive or other reasons, none of the papers was willing to give a specific circulation or distribution total for their publications. Hartford says its paper is "read by several thousand people" each day;[29] and the Journal of Commerce said its "numbers were low but the profit margin was high."[30]

Staffing: From an editorial viewpoint, the number of people needed to produce a fax paper is significantly low. If anyone was employed full-time on publications of this nature, that person was generally a business manager or a marketing person. In almost every case but the New York Times and Effingham/Bloomington, the editorial work was done with less than one-half person day, i.e., a total of perhaps two to three person hours per publication. The New York Times had three editorial persons, a publisher and a manager and Effingham had five people developing its prototypes.[31]

If staffing is a consideration is the future of fax newspapers, it is certainly a minor part of the total picture. With computers, satellites and desktop publishing, a one-page publication can be done in a very short period of time.

Distribution: Technology made a major difference. Companies which specialized in distributing facsimile information were used by the larger publications, including Toronto, Los Angeles and Hartford. In smaller papers, one or more fax machines were used for the limited time needed to distribute one-page newsletters.[32]

Audience Research: The size of the parent newspaper made no difference in whether research was conducted or how much research was done. In fact, little formal research was done at this early stage.

Effingham/Bloomington hired a professional research firm to study its audience. The Journal of Commerce, Minneapolis and Aberdeen were doing some research in-house but few others had done more than listening closely to their audiences. High reader satisfaction levels and the young age of the fax papers accounted for this lack of research.[33]

Discussion:

It is important to remember that this is an experimental area for newspapers. The descriptive statistics in and of themselves do not lend a real picture of what the newspapers offer, or what they are going through in trying to serve their very specialized audiences.

A key reason for fax newspapers, understood but unstated in most cases, was to position the owner in the market if and when facsimile becomes a major player in the information market. If indeed the exponential explosion in the number of fax machines does occur and the fax becomes a common household item, these papers would be in a position to profit handsomely. Until then, they are dealing with specialized audiences and keeping costs as low as possible.

The Journal of Commerce has been through one evolution with a general interest-business publication, similar in form to many of those being offered today, but found a special and more profitable niche in its oil price publication.[34]

The New York Times is distributing through point-multipoint transmission, wherein the fax paper is sent from one point to 25 other points. Other markets are being considered for TimesFax.[35]

The Toronto Globe and Mail FAXsummary is a specialized niche publication, in that is it uniquely Canadian and serves the nation's diplomats. It is bilingual, as per Canadian law. Yet it is transmitted by fax from the United States because the telephone rates are more favorable.[36]

The Effingham and Bloomington FaxTodays are prototypes for other publications in that state and area, which may be started from the same templates very soon. Bloomington was in a position in November, 1990, of having to turn away ads because of good demand and limited space on the fax paper for advertisements.[37]

Two of the fax papers have closed. Knoxville reported it may relaunch the publication as a legal sheet, striving for a "very narrow audience and advertising base." [38]

The Chicago Tribune cited lower than anticipated market demand when it closed its fax paper after four months of operation in August, 1990. "We learned a great deal and are in a position to restart TribFax or other electronic products as opportunities arise," Chuck DelGrande, manager of electronic products, said.[39]

Three subjective comments will conclude this discussion. These may not be scientific, but they do point to the nature of the experiment.

Dennis Schain of Hartford said the fax paper concept is more complex than most people understand. It would seem to outsiders to be a quick computer makeover, and electronic distribution but "it is not a piece of cake. It is a continuing challenge to meet the needs of the paper and the audience."[40]

Bob Frump, assistant general manager of the Journal of Commerce, warned "You can't be seduced by the technology. This has potential, but you have to keep refining the product to suit the needs of the readers."[41]

And perhaps Rick Peterson, manager of the Minneapolis Executive Fax, pointed to the future with the clearest perception:"This is an experiment. We are always reviewing our operation."[42]

This study was intended to be a pilot study, to be conducted in the early stages of the fax operation. It was designed to offer information on the basic formats and functions of facsimile newspapers in the late 1980s and early 1990s.

Projections were not possible, nor were they intended. Business information was not available, and only general statements about profitably were made.

However, several things are clear:

-- The facsimile papers with very specialized audiences, such as the Journal of Commerce, the New York Times, the Los Angeles Times and Toronto Globe and Mail, seem to be doing very well. Their audience is clearly defined and they market to very specialized niches.

-- The general circulation facsimile papers, without a specialized audience, such as Chicago, Minneapolis and Knoxville, did not fare well. Whether for business or other reasons, they did not choose to continue. There may be too many variables involved in the closing of these fax papers to find a common cause.

-- The innovations and specializations are continuing. New niches include cruise ships being served by the New York Times, overseas diplomats by Toronto and New York, and transmission to military outlets in the Desert Storm operation may be only the beginning of electronic specialized news transmission to relatively small, or at least non-mass audiences.

-- The investment in time and equipment on the part of the participating newspapers was not large. In many cases, the computers were already in use and only two to three person hours per day were required to edit a facsimile newspaper. The costs involved, in relation to the general costs of printing a mass circulation newspaper, are miniscule.

-- The clear indication is that shorter stories and brief news notes are making a greater impact on business, professional and governmental readers than one might have imagined. If some readers can be persuaded to buy publications which have stories averaging either 57 words per story (all publications) or 327 words (New York Times), can this be projected to the general population of readers?

-- The Illinois experiment, in which a private, non-newspaper businessman is attempting to compete with established newspapers, may be something newspapers should be concerned with.

-- And finally, facsimile may be just one way in which newspapers deal with specific, splinter audiences. It may signal the further decline of the mass media and the continued growth of specialized publications. For this reason alone, newspapers cannot ignore the importance of fax newspapers.

Notes:

[1] Gordon McComb and Owen Linzmayer, "The Fax Factor," *MacUser*, p. 149, (August, 1989).

[2] "See fax shipments topping 3.9 million by 1993," *The Office*, Nov. 88, p. 73.

[3] Gene Marcial, "Hitching a ride on the fax boom," *Business Week*, p. 84, (June 19, 1989).

[4] Robert L.Stevenson, " The Disappearing Newspaper Reader," paper presented to the Association for Education in Journalism and Mass Communications, Minneapolis, MN., August,1990, p.8.

[5] McComb and Linzmayer, *op. cit.*

[6] "Fax is Back!", Jim Rosenberg, *Editor and Publisher*, March 27, 1990, p 28.

[7] Eric Barnouw, *A Tower in Babel, A History of Broadcasting in the United States to 1933*, (New York: Oxford University Press), 1966, p. 153.

[8] Barnouw, *op. cit.*

[9] *Editor and Publisher*, Nov. 5, 1988, P. 26.

[10] Erik Barnouw, *The Golden Web*, (New York: Oxford University Press) 1968, p. 115.

[11] From *Facsimile*, by Lee Hills and Timothy J. Sullivan, 1949, as reported in *Editor and Publisher*, March 17, 1990, p. 29.

[12] James H. Green, "Facsimile, on the verge of maturity," *The Office*, May, 1987, p. 88.

[13] "Fax Facts," USA Today, June 2, 1989, p.4B.

[14] McComb and Linzmayer, *op. cit.*

[15] "Fax on the cheap," *Personal Computing*, March, 1988, p. 240.

[16] Jim Seymour, PCs and the fax culture, *PC Magazine*, June 13, 1989, p. 77.

[17] Marcial, *op. cit.*

[18] USAToday, *op. cit.*

[19] "Some Papers Take an Electronic Approach to New Products, *presstime*, October, 1990, p. 22.

[20] Chicago Tribune folds fax paper, *Editor and Publisher*, Aug., 18, 1990, p. 13.

[21] Noted in News Inc., November, 1990, p. 44

[22] Telephone conversation with Tom Turco, Gannett News Service, Nov. 21, 1990.

[23] Telephone conversations with fax paper staff members at those newspapers, November, 1990.

[24] Telephone conversation with Bob Frump, Journal of Commerce, Nov. 21, 1990.

[25] Telephone conversations with editors, August and November, 1990, and *Editor and Publisher*, Mar. 17, 1990, p. 28, 32.

[26] All circulation figures from *Editor and Publisher 1990 Yearbook*.

[27] Information provided by editors of papers, phone conversations, Nov., 1990.

[28] Information provided by editors week of Nov. 17-21, 1990.

[29] Phone conversation with Dennis Schain, Hartford FaxPaper, Nov. 21, 1990.

[30] Phone conversation with Bob Frump, Nov. 21, 1990.

[31] Information provided by editors, Nov. 21, 1990.

[32] Ibid.

[33] *Ibid*.

[34] Conversation with Bob Frump, *op. cit*.

[35] Conversation with New York Times Syndicate Sales Corp., Nov. 21, 1990.

[36] Conversation with Jack Bell, Globe and Mail, Nov. 21, 1990.

[37] Conversations with Barbara Hatch, Bloomington and Ellen Brummer, Effingham, Nov. 18, 1990.

[38] Jeff Hively, director of corporate development for E.W. Scripps, reported in News, Inc., Nov., 1990, p. 4.

[39] Chicago Trib folds its fax paper, op. cit.

[40, 41, 42] Telephone conversations with author, week of Nov. 17-21, 1990.

Addendum:

Front Pages of Selected Facsimile Newspapers

Monday
[illegible]ril 2, 1990

Japan edition

TimesFax

From the pages of The New York Times

Six pages ©1990 The New York Times

FROM THE FRONT PAGE

De Klerk, Mandela Run-In Inevitable

By CHRISTOPHER S. WREN

JOHANNESBURG — The indefinite postponement of their first formal meeting has emphasized the differences in the ways President F.W. de Klerk and Nelson Mandela, the anti-apartheid leader, must maneuver to maintain support within their constituencies.

News Analysis

On Friday, Mr. Mandela, the African National Congress leader, informed Mr. de Klerk that his group was withdrawing from the meeting, which was scheduled for April 11 in Cape Town, because the police had fired on peaceful demonstrators in the black township of Sebokeng last Monday, killing at least 11 people.

Sunday, Mr. Mandela told a huge rally in Port Elizabeth that Mr. de Klerk was the first white leader to come to terms with the reality that South Africa was destined to become a democratic country and that his approach was welcomed.

The different approaches taken by Mr. de Klerk and Mr. Mandela reflect concerns — and vulnerabilities — in their respective constituencies that were bound to bring them into conflict .

President De Klerk has assured white voters that he remains in control of the country at a time of epic change and despite a rising tide of black protest. But this makes it difficult for him to discipline the police, upon whom whites rely when they feel their security is threatened. Mr. Mandela, for his part, has tried to show blacks that he has not sold out the anti-apartheid struggle by talking to the Government.

Civil Rights Groups' Woes

NEW ORLEANS — The South is awash in remembrances of civil rights groups that made history 25 years ago. But around the nation, the groups that survived are struggling to adapt to a more diverse black America, more complex issues and more competition for members.

Europe Seeking New Direction

By ALAN RIDING

BRUSSELS — The disintegration of the Eastern bloc, though generally welcomed across Western Europe, is challenging the European Community's vision of the future just when it seemed to be moving confidently along a path toward economic and eventual political union.

Senior government and community officials say that over the last four months, the need to make room for East Germany and assist Eastern Europe's other emerging democracies has threatened to distract the 12-nation group from its immediate task of creating a single market by the end of 1992.

The prospect of German reunification, the officials say, has also stirred fears that Bonn may lose interest in European integration or, alternatively, that a single Germany will be so rich and powerful that it will dominate the community.

The result has been something of a crisis of identity as community members and the European Commission, the bloc's influential executive body, struggle to redefine their objectives.

Gloom Begins to Lift

This period of tension has been characterized most sharply by a wave of distrust between France and West Germany, the countries that have long served as the motors of European integration. The gloomy mood at the community's headquarters has recently begun to change. The community's leading members appear to have agreed on the direction they should take.

The direction involves choosing the "little Europe" path — that is, maintaining the 12-nation bloc, with its 320 million inhabitants and $4.3 trillion gross product, and moving rapidly forward beyond the single-market stage to full economic and monetary union and closer political cooperation.

Soviets Increase Forces in Lithuania

MOSCOW — The Kremlin sent a column of armored personnel carriers through the Lithuanian capital, strengthening both the Soviet military presence and the psychological pressure on Lithuania to retreat from its claim of independence.

The latest move came a day after President Mikhail S. Gorbachev delivered an appeal to Lithuania to "annul" its declaration of independence as the price for negotiation or invite "grave consequences" on both sides in the dispute.

Officials in Vilnius, the Lithuanian capital, reiterated that while a retreat from independence was out of the question all other issues were open for negotiation. The two sides remained far from a common path toward talks, with the situation remaining tense.

Welfare Policies at Odds With Reality

NEW YORK — Two years ago Congress overhauled the welfare system on the premise that people on public assistance did not need handouts as much as they needed a helping hand to find and keep a job.

Now, as states try to comply with a key provision of the law that became effective Sunday, sparks are flying as idealistic policies confront economic realities.

Some public policy analysts say that the effort was crippled even before states began to address the latest requirement of the law: providing one year of subsidized child-care and medical benefits to welfare clients who get jobs outside the home, with the additional costs to be shared by the states and the Federal Government. Critics say that the law does not assure that welfare clients will receive enough money to pay people to care for their children.

MOSCOW EDITION

Los Angeles Times

NewsFax

TODAY'S NEWS/TOMORROW'S TRENDS

Friday
April 6, 1990

D.C. Summit Advanced Two Weeks

WASHINGTON—President Bush and Soviet leader Mikhail S. Gorbachev will hold their second summit meeting in Washington from May 30 to June 3, the two countries announced Thursday.

The dates are about two weeks earlier than expected. U.S. and Soviet officials said that the summit apparently was advanced primarily to accommodate the crowded schedules of Bush and Gorbachev.

Soviet spokesman Gennadi Gerasimov said the meeting would be "a working visit, no time for sightseeing." It is expected to take place in or around Washington, with no visits by Gorbachev to America's heartland or the West Coast, althougha trip to Bush's summer home at Kennebunkport,Me., has been rumored.

Bush said merely that the summit would provide "time for a lot of dialogue and a lot of discussion." Presidential spokesman Marlin Fitzwater called it a "tough-love" summit, with the crisis in Lithuania a key topic for discussion.

"Is Lithuania an issue? Yes," Fitzwater said. "Does it affect our relationship. Yes. Will it have an effect on the summit? Depends on what happens."

Bush and Gorbachev met last December on storm-tossed ships at the Mediterranean island of Malta. Since then, Lithuania's drive for independence and Moscow's efforts to intimidate the Baltic state into reverse course have threatened to strain superpower relations.

At the coming summit, Bush and Gorbachev are expected to sign new agreements to reduce chemical weapons and to implement previous nuclear test ban treaties, the officials said. In addition, the two leaders are expected to clear away remaining obstacles to a Strategic Arms Reduction Treaty (START) that will cut offensive nuclear weapons on both sides by 30% to 50%.

A proposed statement declaring that the two sides intend to continue arms negotiations beyond START is being discussed by Secretary of State James A. Baker III and Soviet Foreign Minister Eduard A. Shevardnadze, who began three days of talks in Washington on Wednesday.

The statement may be completed by the summit or wait until formal signing of the START agreement sometime later in the year, officials said.

"The Soviets have expressed a desire" for such a statement, a senior U.S. official said. Baker, be added, responded to the Soviets that "we're interested in discussing the contents, the subjects [of any new negotiations] before committing to it."

Soviet START negotiator Yuri Nazarin told a news conference that future negotiations could include a possible limit or ban on multiple-warhead, land-based missiles. Both sides agree such weapons are destabilizing because they are capable of, and also tempt, a surprise attack.

"This subject is an important problem but is out of the range of the treaty we are now discussing," Nazarin said. "This question could be dealt with in the next stage, in new negotiations, from the point of view of increasing strategic stability."

An effort to address the issue still could occur within the ongoing START negotiations, however.

The three days of Baker-Shevardnadze talks are scheduled to end today following a Shevardnadze visit to the White House and press conferences by the two men.

On Wednesday, the two men engaged in an extensive discussion of Lithuania —"a serious, hardball exchange of opinion," according to Gerasimov—in which Baker emphasized that a Soviet crackdown on the independent-minded Baltic state could set back U.S.-Soviet relations.

—ROBERT C. TOTH
TIMES STAFF WRITER

Lithuania Calls for Dialogue on Secession

MOSCOW—The Lithuanian Parliament, in a conciliatory message to Soviet President Mikhail S. Gorbachev, declared its readiness on Thursday to discuss its decision to secede from the Soviet Union within the context of the Soviet Constitution.

"We propose to have as soon as possible preliminary, bilateral consultations with the goal clarifying the positions of both sides on the problems of mutual interest," the Lithuanian Supreme Council said in reply to an appeal by Gorbachev last weekend to annul its unilateral declaration of independence.

Lithuania, the resolution continued, "is ready to discuss through dialogue the essence and letter of the acts and resolutions adopted by the Supreme Council of the Republic of Lithuania from the point of view of international law and the constitution of the Soviet Union."

While the resolution did not back away from Lithuania's March 11 declaration of independence from the Soviet Union, the willingness to discuss the issue within the Soviet constitutional context was a major step toward meeting Moscow's conditions for resolution of the secession crisis.

Almost as important was the Lithuanian proposal for "consultations," rather than the "negotiations" that the breakaway republic had demanded previously, and the resolution stressed the desire for "dialogue" and a political solution.

The Supreme Council's resolution, adopted after prolonged debate, also underscored Lithuania's unwillingness to negotiate under what it regards as military pressure.

"Lithuania, as before, is prepared for honest dialogue, but this should not be accompanied by the willful actions of your armed forces," the council said.

About 50 armed Soviet soldiers dressed as policemen had taken over the Lithuanian state prosecutor's office earlier Thursday, expelling most of its employees and taking up positions on each floor, a Lithuanian government spokesman said.

Kazimieras Motieka, deputy head of the Lithuanian Parliament, said that the soldiers, dressed as police and carrying boxes of ammunition and other supplies, apparently were being deployed as a prelude to a complete takeover of the chief prosecutor's office by the central government.

The Globe and Mail
FAXsummary

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Canadian News for Wednesday, January 31, 1990, from Canada's National Newspaper

Opposition calls for ouster of CN vice-chairman

Transport Minister Benoit Bouchard says he will await a report before responding to MPs' demands that CN Rail vice-chairman Brian Gallery be immediately ousted from the board for a conflict of interest.

Gallery is reported to have tried to pressure CN Rail to continue running advertisements in two small transport industry magazines which he owns and publishes.

Gallery, who is a close friend of Prime Minister Brian Mulroney and president of a Conservative Party fundraising organization which offers access to the prime minister for major contributors, was acting chairman of CN when company officials announced plans to cut advertising.

Gallery was appointed to his new post at the Crown corporation last month, just one month after losing his position as acting chairman.

CBC trims jobs, spending to avoid further cuts

The CBC will remove a layer of management from its headquarters in Ottawa and cancel some of its commercial activities to meet the $140-million in cuts ordered by Finance Minister Michael Wilson in last spring's budget.

The downsizing, which will eliminate about 500 positions from a total payroll of about 10,000 employees, will be accomplished with a minimal impact on programing and regional stations, CBC president Gerard Veilleux announced Tuesday.

The new president has also cut CBC spending plans harder and faster than was called for in the budget last April in the hope of forestalling a new round of deficit-reducing measures in the next budget expected in February.

Fighter pilot's body found near crash site

Hope that a CF-18 fighter pilot ejected from his cockpit seconds before his jet exploded in a fireball ended Tuesday when a body was found near the crash site in Canada's arctic.

Military investigators reported Tuesday that Captain Richard Corver didn't eject from the fighter before it exploded on the frozen tundra Monday morning, lighting up the Arctic darkness around Inuvik.

A military board of inquiry has been convened to investigate why the jet, laden with highly explosive fuel, crashed within one minute of take-off 3.5 nautical miles off the airport runway. It was the last of three fighters that left the runway at 300 km/h to stock an unarmed U.S. cruise missile as it was being tested over the Mackenzie Valley.

Referendum pondered if Meech deal fails

Quebec Premier Robert Bourassa evoked the possibility Tuesday of another referendum over Quebec's future.

But Bourassa said he is telling potential investors that even if Quebeckers voted to get out of Confederation, there would be a form of economic union between Quebec and the rest of Canada along the lines of the European Common Market.

Bourassa, on a 10-day trip through Europe to attract business to Quebec, was expanding on remarks he made Monday about what kind of "political superstructure" could evolve in Canada if the Meech Lake constitutional accord is not ratified by all provinces before its June deadline.

Toronto to go ahead with Olympics bid

Toronto City Council decided late Mondy night to submit formally a bid for the 1996 Olympic Games despite opposition from almost one-third of its members.

After five hours of debate, the vote was 12-5 to send a bid to the International Olympic Committee, which will select the host city in September from among six bidders.

Many of the concerns heard during the debate were about financial uncertainties surrounding the multi-million dollar bid — and the possibility that it could prove a huge public liability.

Inquest set for Feb. 15 in tennis club death

An inquest into the death of retired insurance executive F. Kingsley Doody, who was dining at a posh anglophone tennis club when he suffered serious injuries under mysterious circumstances, is to open Feb. 15, says Montreal Coroner Marc-Andre Bouliane.

Doody, 81, dined last Aug. 31 with Dr Dimitri and Bogdanka Pivniki — father-in-law and mother-in-law of Prime Minister Brian Mulroney — and Senator Hartland Molson at Hillside Tennis Club when he suffered rib and hip injuries after urinating on a member's tennis gear in a locker room at the club.

Doody was taken to hospital and died Oct. 2. Police, unable to determine whether the injuries stemmed from an accidental fall or an altercation, say their investigation was hampered by club members' reluctance to discuss the incident.

York's 'fascist' benefactor causes faculty distress

York University professors are torn over the Toronto university's acceptance of a $1-million (U.S.) donation from a powerful ultra-nationalistic Japanese philanthropist who has described himself as the world's wealthiest fascist.

York accepted the donation in November from the Japan Shipbuilding Industry Foundation, headed by 91-year-old Ryoichi Sasakawa. The foundation, which takes in more than $10-billion a year earns its money from legal gambling on motorboat races.

York's president said Tuesday his administration will be more careful in future before it accepts donations from sources that are not well-known. But, Harry Arthurs told a debating forum of professors at York, he is not embarrassed by accepting the money.

"We've acted reasonably, we've made a tough judgment call, we've acted for the good of the students and we ought not to feel any embarrassment," he said.

Immigrant investors tend to favor B.C.

Immigrant investors poured more than $100 million into Canada in the first 10 months of 1989, almost double the pace of 1988, according to federal government figures. British Columbia was by far the favored province of the investors, say figures compiled by the federal Department of Employment and Immigration.

Immigrant investors came mostly from Hong Kong and Taiwan, with others coming from England, West Germany, the Philippines and the island of Macao, a Portugese colony.

Wednesday, March 28, 1990
On your desk
weekdays by 4:30 p.m.

Courant
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Dow Jones Average As of 3:45 p.m.
30 Industrials 2,735.13
Down 1.80

Top news

■ **Senate President Pro Tem John B. Larson** says he will not be a candidate for governor this year. Meanwhile, Democrat Bruce Morrison's bandwagon keeps rolling along... ■ **Former treasury worker Paul F. Papa** is arrested on two charges of stealing almost $30,000 from the state treasury... ■ **To the cheers** of past and future co-workers, the first wave of Colt strikers walked triumphantly into the Hartford plant this morning, ending the longest labor dispute in state history.

Business

■ **AT&T** says it will eliminate 250 jobs at its facilities in Wallingford and Cheshire... ■ **The U.S. economy** grew only 1.1 percent in the last three months of 1989 — its weakest quarterly advance in three years — the government said Wednesday, and analysts predicted it will continue to expand this year but at its slowest pace since the last recession. For the year, the economy grew 3 percent... ■ **Its proponent** says it was a noble idea that failed: A state cap on interest rates has succeeded only in driving nearly $1 billion in credit card business out of state. With People's Bank as the only large credit card operation left in Connecticut, the state House voted overwhelmingly to repeal the cap... ■ **Inside Business** looks at on a computer company that is a clearinghouse for demographic information on all 169 cities and towns. In addition to marketing firms, the state is a client... ■ **People's Bank** is sinking foundations for the first residential building at 1401 Farmington Ave., a luxury retirement village... ■ **Kollmorgen Corp.** says it will sell a new issue of convertible stock to a single group of investors who will end up owning 13.8 percent of the Simsbury-based company. Vernitron, which has been in a legal battle with Kollmorgen since their proposed merger fell apart, says it will go to court to block the stock issue... ■ **High interest rates** and declining consumer confidence kept new home sales at depressed levels in February, analysts said today, although the government reported they bounced back slightly from steep declines the previous two months...
■ **Torchmark Corp.** has offered an estimated $6.34 billion in cash and stock to acquire American General Corp., another insurance and financial services company... ■ **A former Labor Department official** nominated by President Bush to be the nation's top savings and loan regulator faces tough questioning from senators about alleged conflicts...
■ **Japan's trade minister** hinted today that Tokyo is considering making a concession to the United States by revising a law that limits the spread of large stores, government officials said... ■ **Lockheed Corp.'s annual meeting** is Thursday, but the results of investor Harold Simmons' crusade to unseat its board of directors won't be known for another week or so, the company said today...
■ **Investment fund wizard Peter Lynch** says he is retiring as manager of Fidelity Investments' $13 billion Magellan mutual fund, the nation's biggest mutual fund and one he steered to booming growth... ■ **The nation's computers** — from big mainframes at universities and government installations to the personal computer that keeps track of your household finances — are vulnerable to a variety of intrusions by pranksters, vandals and common thieves. And computer experts are split over how to deal with the threat — or even what the threat is... ■ **Directors of UAL Corp.** meet after contacts with a union employee group that is trying to buy the airline company, and amid speculation that the board is closing in on a deal... ■ **The laser video disc market** got a shot in the arm Wednesday with the announcement that a Sony Corp. division has begun making the movie discs in the United States... ■ **The French government** declared war on tobacco today, approving a draft law banning all cigarette

Connecticut news

■ **Butch D'Aquila,** the last remaining suspect in the Patriarca crackdown, turns himself in to authorities... ■ **A forklift operator** who was laid off Friday chose 23, the date of his last day of work, as one number on his lotto ticket. It won him $10 million... ■ **Glastonbury police are still** sorting out the details of a school bus accident that killed a 6-year-old boy Tuesday. Police aren't sure which side of the bus the youth was on when he was hit. At the scene today, people were dropping off flowers, and someone scrawled a eulogy to the boy on the spot where he was killed... ■ **More than 700** junior and senior high school students from around the state will exhibit their strange and esoteric experiments at the Connecticut Science Fair at Trinity College this week...
■ **Ben F. Andrews,** former Hartford city councilman and state NAACP president, has paid his $1,500 tax bill — just before he was arrested on a felony bad check charge...
■ **William F. Buckley Jr.** and George McGovern are scheduled to square off tonight at Central Connecticut State University in New Britain in a debate over Reagan foreign policy and recent changes in Eastern Europe... ■ **The prosecutor** and defense attorneys for David Peterson are scheduled to give closing arguments this afternoon. There is a chance a three-judge panel will then rule on whether Peterson was insane when he fatally stabbed Jessica Short in Middletown.

State government/Politics

■ **On the eve of a key judiciary committee vote,** it appears pro-choice legislators will settle for the repeal of criminal laws on abortion and not seek a codification in law.

National

■ **William M. Galvin,** a former consultant for Norden Systems and key figure in the Pentagon's defense procurement probe, pleads guilty to charges he bribed an assistant Navy secretary, Melvyn Paisley, and another senior Pentagon official to influence the award of defense contracts... ■ **The Supreme Court** hears arguments in a case involving Channel 18 in Hartford — a dispute that could affect federal affirmative action programs... ■ **A Senate environment subcommittee** public hearing on lawn care pesticides hears testimony about hazards of chemicals but is abruptly halted by a rarely invoked rule that limits a hearing's length... ■ **An eight-year study** exploring the dangers of fat concludes that being overweight causes about 40 percent of all heart disease in U.S. women... ■ **Bipartisan legislation** to create a Department of the Environment heads for a vote in the House where approval is expected.

International

■ **In another show** of defiance, Lithuanians ignore the deadline for turning their weapons over to the Soviet Army. In Washington, the White House says the Bush administration is making its opposition to the use of force in Lithuania known to Moscow in the strongest fashion...
■ **British customs officials** say they foiled an attempt today to smuggle 40 U.S.-made nuclear trigger components to Iraq through London when they arrested five people, including an Iraqi... ■ **Masked gunmen kill** an American missionary as he prays with his family in their south Lebanon home... ■ **Hundreds of South African** soldiers and police are deployed in Natal province to try to stop battles between rival Zulu factions over what kind of government should succeed the system of apartheid... ■ **A dispute erupts** in

WJBC Weather Watch:
Today: Fog ending, showers, high of 53.
Showers tonight, low of 45.
omorrow: Occasional rain, high of 56.
Sunday: Rain ending, high of 63.

FaxTODAY®

THE LATEST NEWS... NOW

Stocks At 9:10 A.M.
NYSE Volume: 19 Million
DJIA........2716.20 ..-11.50
S&P 500 ...340.70 ....-0.09
NASDAQ ..434.94 ....-0.48

lay, March 30, 1990 *On Your Desk By Noon Monday–Friday* **Bloomington, Illinois**

CAL

■ **No Takers for Enterprise Zone Land.** The town of Normal is having no luck disposing of property in the Diamond-Star enterprise zone, in spite of economic incentives. Normal City Manager Dave Anderson said the configuration of the 50 acres along College Avenue is part of the problem, and the area also needs roads. The council will be asked to sell the land to a private developer.

■ **Pesticide Fire Aftermath.** Clean-up from the pesticide storage shed fire in Lexington yesterday may take a month, according to the firm hired to do the job. James O'Brien of the Environmental Protection Agency said the first step is to keep contaminated water from the storm sewer system and from running into water supply run-off. A temporary water treatment plant has been set up outside of the village to keep any toxic materials from Turkey Creek.

■ **Local Advertising Firm Honored.** The Peoria Advertising and Selling Club presented six first-place Adam Awards to CS&A Advertising of Normal. The awards are for creative excellence.

■ **More Lay-offs at Eureka.** A total of 53 workers will be temporarily laid off at the Eureka plant today, bringing the number of affected employees to 364. An additional 90 workers are on leave. The cut has to do with changing market conditions, according to Eureka officials, and is not related to the 200 jobs moved to El Paso.

TOP NEWS

■ **House Pases Child-Care Bill.** The House passed its own version of a child-care bill, yesterday, that would expand day-care programs and increase funding to established programs. The ate already approved another version of the bill that focused on ng families find and afford day-care for their children.

Miner's Aid Rejected In Clean Air Bill. The Senate defeated a plan that would have given cash payoffs to coal miners who lose their jobs because of the new clean air bill. The Senate is expected to approve the package of amendments to lessen acid rain, airborne toxic chemicals and urban smog in the environment next week.

■ **Eastern Airlines Faces Liquidation.** Unsecured creditors of Eastern Airlines are asking for a trustee to begin the liquidation process of the airline's equipment. Eastern Airline officials feel a compromise can be worked out to save the failing airline.

■ **Black Leaders Work Toward Peace.** Nelson Mandela and Zulu Chief Mangosuthu Buthelezi announced that they would hold an unprecedented joint peace rally in an effort to bring peace to the Zululand where fighting has killed at least 25 people in two days.

■ **Bush Urges End To AIDS Bias.** President Bush urged Americans not to tolerate discrimination against AIDS victims yesterday. Bush was interrupted several times by AIDS activists who criticized him for his weak efforts to help AIDS sufferers.

JNCHEON SPECIALS

■ **Schooners (Monday's Special)**
Grilled Reuben, German Potato Salad $3.50
■ **Shanigans**
Shrimp Basket, Fries $2.99
■ **Beningo's**
Fettuccini Alfredo, Salad, Garlic Bread $3.95
■ **Bennigan's**
Tenderloin Steak Club, Fries $4.95
■ **Avanti's**
alian Beef Sandwich with Mozzarella $2.90
ellow Dragon Cafe
Sweet & Sour Chicken or Beef with Snow Peas, Drink $3.50

BUSINESS/FINANCE

■ **Tokyo Stocks Tumble.** Tokyo stocks fell further today when an unexpected increase in buy orders for the new fiscal year starting Sunday failed to revive the stock decline. The Nikkei average drop 1,045 points to close at 29,980.

■ **First Chicago Reports Profit Loss.** First Chicago Corp., the Midwest's largest banking company estimated that its first-quarter profits will be 50% lower than a year earlier.

■ **GE Attempts To Support Securities Firm.** General Electric will pour $550 million into Kidder Peabody in an effort to bolster the big securities firm's balance sheet amid Wall Street's continued slump.

■ **Hefty Removes Bio-Degradable Claim.** The Mobil Corporation announced that it would remove the words bio-degradable from its Hefty trash bags bowing to the demands of environmental groups.

■ **Program Trading Battles Continue.** A hearing on program trading led to the Treasury Department, Federal Reserve and the Securities and Exchange Commission agreeing on a proposal that would give a single agency jurisdiction over index futures. The officia are divided on which group should be given regulatory responsibility

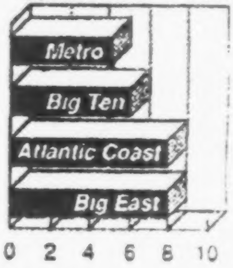
■ **Building Permit Values Unchanged.** Building permit values issued in the nation's 202 largest cities were $53.4 billion last year, unchanged from $53.5 billion in 1988 according to Dun and Bradstree

■ **Average Farm Prices Rose.** Livestock and fruit increases offset declines in dairy and vegetable prices as the average farm prices for March rose 1.3% from February, the Agricultural Department said.

■ **Foreign Stock Report.** Tokyo stocks tumbled today as the Nikk average dropped below 30,000. Hong Kong, Singapore and Sydney were all off. London and Frankfurt were up.

SPORTS

Conferences With The Most Final Four Appearances In The 80s



■ **ACC Boasts Two Final Four Teams.** Georgia Tech and Duke will represent the Atlantic Coast conference in the Final Four of the 1990 NCAA tournament, Georgia Tech meets UNLV and Duke plays Arkansas tomorrow night in Denver. Both the ACC and the Big East had eight teams in the Final Four in the 1980s.

■ **NCAA Considers Replay Use.** Georgia Tech's controversial win over Mich. State in the NCAA tourney spurred the NCAA men's basketball rules committee to consider using instant replays. The 12-man rules committee will meet Sunday through Tuesday in Denver and will consider the issue.

■ **Olajuwon Makes NBA History.** Akeem Olajuwon became the third player ever to record a quadruple-double in the NBA last night. Olajuwon had 18 points, 16 rebounds, 11 blocked shots and 10 assists as Houston defeated Milwaukee 120-94.

STOCKS THIS MORNING

■ **Stocks Fell** on follow-through selling from Thursday and a steep decline in Tokyo. Decliners led advancers 685-282.

ADM	22 5/8	+1/8
AT &T	42 1/8	-1/2
Base	15 3/8	+1/2
Caterp	60 3/4	-1/2
Chrysler	16 5/8	-1/4
CILCO	34 3/4	—
CIPS	21 3/4	+1/8
Deere	72 5/8	-3/4
Deluxe Check	30 3/8	—
GE	64 1/4	-1/4
GTE	63 1/2	-1 1/8
GM	46 3/8	-1/4
Georgia Pacific	43	-1/8
IBM	105 7/8	-1/8
INB	27 1/4	—
Ill Power	18 3/8	—
Magna Group	16 1/4	—
Marine Corp—IL	18 7/8	-1/8
Union Camp	35 1/8	-1/8
WalMart	47 1/8	-1/4

Proceeding to Pagination:
Ontario newspaper editors assess new technology

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Presented to the Newspaper Division, AEJMC
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Abstract

Pagination, a novelty just five years ago, is rapidly becoming the dominant production technology for Ontario daily newspapers. This paper reports that 19 of 42 dailies now use pagination to some extent and 18 others plan to convert. The paper examines the rapid spread of the technology and how managing editors think pagination affects news desk editors. Managing editors like the transfer of control to the desk brought about by pagination. They also like the physical appearance of paginated newspapers. But many worry about system reliability, how copy desk editors will adjust to the technology, and whether the demands of electronic page make-up damage the craft of editing. The paper finds that the decision to convert to pagination often has little to do with the editors who actually work the machines. It also finds that pagination has not brought about any large-scale expansion of news desks.

Introduction

At copy desks in newspapers across Ontario, editors are experiencing a remarkable transition in the way they do their jobs. The change is being brought about by a long-anticipated computer technology known as pagination.

Put plainly, pagination is electronic page makeup. The implications of this simple phrase for working editors are, however, quite startling. One of the authors of a 1987 handbook for American newspaper editors calls pagination "the most revolutionary production change since the introduction of the linotype." (Rawlins, APME, 1987).

This paper looks at the spread of pagination technology among daily newspapers in the Canadian province of Ontario[1] and examines the impact it has had on working editors.

It finds that pagination is rapidly becoming the dominant technology for producing news pages, although the sophistication of the systems in use varies from newspaper to newspaper.

It also finds that many senior editors see pagination as a tool that gives copy and page editors complete control of the production of newspaper pages. Some editors worry, however, that pagination transfers too many technical functions to what was traditionally a "wordsmithing" craft.

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[1] Ontario is home to 9.5 million of Canada's 26 million people. More than one-third of the country's 110 daily newspapers are published there.

Review of the literature

The introduction of computers in newsrooms has been examined by a number of scholars and in the trade press. According to Carter (1984), computers are the predominate technology in some parts of the newspaper industry. Dearman and Howells (1975) see the computer as reuniting the jobs of printer and journalist, functions that were separated in the 19th century. Smith (1980) says the consequences of computerization include the withering away of the craft of compositor, and the addition of data handling functions to the work of journalists.

Several scholars have looked at electronic editing. Randall (1979) found that typographical error rates were lower with VDT technology than hot-metal; Kurtz (1980) found that editors using VDTs gained more responsibilities. Shipley and Gentry (1981) found VDT editing slower, but more accurate than pencil-and-paper editing. In a later study, Lindley (1988) reported that copy editors rate VDT editing as both faster and cleaner. Kurtz (1980) found that the number of jobs for editors has increased since VDTs were introduced.

There has been comparatively less research on how editors react to pagination, a recent evolutionary development that adds the full range of electronic page makeup options to the editing functions of VDTs. Standera (1987), examining so-called desktop publishing, has identified a number of trends brought about by the desktop revolution: one is a change in the centre of gravity of publishing, with control moving closer to the author or editor; a second is the vanishing borders of pre-press activity. Shipman and Fowler (1988) have found that pagination gives editors a new sense of control, but with that comes burdens some editors may not be willing to bear. They also report that the level of job satisfaction is directly related to the degree of involvement the individual editor had in planning the implementation of pagination. Russial (1989) points out that pagination shifts the focus of editorial work more toward the "manual" than the "mental."

Pagination has been reported on extensively in the trade press, especially in computer-industry publications and in publications aimed at newspaper managers.

Handbooks produced by various Associated Press Managing Editors (APME) committees in 1985, 1987, 1988 and 1989 focus on how managers can adapt the technology to the newspaper. Articles in the 1987 handbook produced by a technology committee summarize some of the promises of the technology: pagination gives editors control over the production process and frees up their creative instincts (Rawlins); increases speed (Wolferman, Hanke) and saves time and money in production (Hanke). Thorough training is essential, but once trained, few editors would be willing to return to the old way of making up pages (Wolferman). And while the realization that the newsroom becomes the production department is "sobering," the change is likely to mean more jobs for editors (Rawlins). Authors of the 1988 handbook emphasize that pagination will redefine jobs (Wilson) and will likely create jobs for editors (Wilson and

Foxworth).

This paper took as its starting point the promises of pagination discussed in the 1987 and 1988 APME handbooks, particularly its effect on the work of editors. It also sought to investigate the "why" of pagination: the reasons newspapers in Ontario were making the switch.

Research questions and methodology

Scholars in the United States and writers for the trade press have tracked the evolution of pagination at daily newspapers in that country. The technology has received little scholarly attention in Canada, however, and no one has catalogued the kinds of computer systems in use. The first task in researching pagination at Ontario daily newspapers, therefore, was to map out the state of the technology.

Telephone interviews were conducted in June and July, 1990, with senior editors at all 42 Ontario general-circulation daily newspapers. The interview subjects were managing editors, who were selected as a target group for two reasons: they are deeply involved in decisions on new technology; and the focus of their work is the newsroom, where the technology is being introduced.[2]

The interviews sought open-ended responses to a series of research questions, roughly divided into two groups. The first questions sought information on computer usage, specifically whether the newspaper was using or planned to use pagination technology, and the reasons for a transition to pagination.

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[2] At a handful of newspapers, managing editors referred questions to the production editor or to systems editor. Three referred questions to the editor-in-chief, and five to the publisher.

The second group of questions focused on the editors' assessment of pagination, specifically, the chief benefits and drawbacks involved and what pagination means for the craft of editing. Editors could give an unlimited number of responses to the questions.

Since the interview subjects were managers -- managing editors, other senior editors or publishers -- the assessment of the technology came from a managerial perspective rather than from copy editors who work with the equipment day in, day out. Interestingly, though, many of the senior editors interviewed at newspapers that have converted to pagination indicated they had been trained to use the system. Thirteen of those interviewed said they were able to produce a paginated page of copy at their newspapers.

The state of the technology

1. Who's using what where

The interviews found that 18 of the 42 dailies were using pagination technology to some extent on their regular news pages, and a 19th newspaper was to introduce pagination before the end of 1990. Eighteen others indicated plans to introduce pagination technology, six of them within three years. Only five indicated no interest in pagination.

This simple tally shows that pagination is rapidly becoming the dominant technology for producing newspaper pages in Ontario. And even at papers that don't use it, the attitude of managers is set on the introduction of pagination.

One of the remarkable things about pagination is the speed with which it has spread. In 1985, the Windsor Star was viewed as a ground-breaker when it introduced the first pagination system in the province. Over the next two years, two other newspapers followed suit. The pace picked up in 1988 and 1989, with four conversions each year. And in 1990 alone, eight newspapers introduced pagination.

Paginated papers: The newspapers using pagination range from some of the largest and most influential in the province to some of the smallest. The level of pagination, and the sophistication of the equipment in use, varies greatly.

Ottawa's French-language tabloid LeDroit (circulation 33,500)[3] is among the most technologically advanced in North America -- a "paperless" newspaper where an integrated network of computers handles everything from ads to pictures to news copy. Pagination of news pages, done on top-of-the-line Macintosh terminals and Quark X-Press software, is just one component of a fully integrated computerized production system. A second Ontario newspaper, the Kenora Daily Miner and News (circulation 5,000) which also uses the Macintosh and Quark combination, is almost as advanced as LeDroit.[4]

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[3] Circulation data for all newspapers are 1990 figures drawn from the Matthews List produced by the Southam Business Information and Communications Group Inc.

Most Ontario newspapers don't have integrated computer systems, however. Classified ads, display ads, news copy and pictures are all produced by separate departments, then put together in the composing room. When editors of these papers speak of pagination, they are referring to news page systems, in which an editor sitting at a video display terminal selects, edits and lays out copy and headlines for the news hole.

At the time of the survey, five newspapers[5] were paginating all news pages, electronically composing everything in the news hole except photographs and graphics, which were still stuck on by hand in the composing room. Most of these papers were in the process of (or on the verge of) adding electronic photo desks, which would allow editors to lay out pictures and graphics electronically.

Six dailies[6] were paginating stories and headlines on more than half their pages each day. Compositors placed photographs on the pages, and some pages were still being made up by hand. Another daily[7] was paginating all pages with a news hole of 40 per cent or more.

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[4] At the time of the interviews, its pages came off typesetters in tiles, which were assembled by compositors. Each page was composed of three tiles.

[5] The Brantford Expositor (circulation 32,700), Hamilton Spectator (circulation 140,000), Orillia Daily Packet and Times (circulation 10,900), Toronto Globe and Mail (circulation 330,000) and Windsor Star (circulation 85,500)

[6] The Barrie Examiner (circulation 14,100), Kingston Whig-Standard (circulation 37,000) Lindsay Daily Post (circulation 6,000), Niagara Falls Review (circulation 22,800), Owen Sound Sun Times (circulation 24,000) and Sault Ste. Marie Star (circulation

At the remaining newspapers using pagination technology[8] the equipment was still very new, and was being used only on selected pages. One newspaper[9] was about to introduce pagination, and planned to move into it slowly. All anticipated eventual shift to full pagination for news pages -- or as close to it as they could get.

Planning to paginate: Among the newspapers indicating plans to paginate, six expected to convert within two to three years.[10] The remaining 12[11] indicated longer-range plans to convert, or

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27,000)

[7] The St. Thomas Times-Journal (circulation 10,000)

[8] The North Bay Nugget (circulation 24,000), Ottawa Citizen (circulation 185,000), St. Catharines Standard (circulation 43,200) Woodstock Sentinel-Review (circulation 10,500)

[9] The Belleville Intelligencer (circulation 19,000)

[10] The Brockville Recorder and Times (circulation 16,300), Chatham Daily News (circulation 16,200), Port Hope Evening Guide/Cobourg Daily Star (combined circulation 9,600), Sarnia Observer (circulation 24,400), Toronto Star (circulation 526,000), Toronto Sun (circulation 291,000)

[11] The Cornwall Standard-Freeholder (circulation 18,300), Fort Frances Daily Bulletin/Times (combined circulation 9,000), Guelph Mercury (circulation 19,200), Kitchener-Waterloo Record (circulation 81,200), London Free Press (circulation 124,000), Oshawa Times (circulation 21,500), Pembroke Observer (circulation 7,400), Simcoe Reformer (circulation 10,200), Stratford Beacon

offered no timetable for conversion.

No plans to paginate: Only five newspapers indicated no interest in converting to pagination.[12] One is only a few years old. Editors at three others said the equipment the newspapers are using is relatively new and will not need to be replaced for some time.

2. Why paginate?

Editors, newspaper managers and computer specialists agree that pagination gives copy and layout editors fuller control over the pages they produce, and that this is a change for the better. Twenty of the Ontario editors interviewed -- representing just under half the dailies in the province -- mentioned this consolidation of control at the news desk as one of the chief benefits of pagination.

It would be incorrect, however, to assume that this transfer of control to the news desk is the key reason for switching to pagination.

What factors are involved? Two most often cited by the Ontario editors are the state of existing equipment in the newsroom, and a desire to make savings in the composing room. Neither, it should

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Herald (circulation 14,100) Sudbury Star (circulation 28,700), Thunder Bay Times-News/Chronicle-Journal (combined circulation 38,000), Welland Tribune (circulation 17,400)

[12] The Cambridge Reporter (circulation 14,200), Kirkland Lake Northern Daily News (circulation 5,800), Ottawa Sun (circulation 32,400), Peterborough Examiner (circulation 28,000) and Timmins Daily Press (circulation 12,700)

be noted, relates directly to the work of the news desk editors who actually work with the pagination equipment.

Technological factors: Eleven editors interviewed mentioned the state of their computer equipment as a major determining factor in the decision to convert to pagination. Once the equipment becomes obsolete, they said, the switch makes sense, both financially and technologically.

For some the equipment problem has become critical. The Toronto Star, Canada's largest-circulation daily, has been limping along with a 12-year-old computer system put together by a company that is no longer in business.[13] The Belleville Intelligencer has been using even more primitive equipment -- typewriters and an optical character scanner.

Other editors said their present equipment is fine -- for the present. Conversion to pagination will occur when the existing equipment gets too far out of date.

Many newspapers tend to wait as long as possible before replacing their newsroom computers. This is due in part to the substantial cost of the equipment[14] and to the rapid pace of change in what is available. New equipment comes on the market almost monthly -- and at new, lower prices. For example, LeDroit's fully integrated computer system, using entirely off-the-shelf equipment, cost $1.6 million. It replaced an Atex system that cost $6 million, says production manager Rob McDougall (interviewed December, 1990).

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[13] The Star has recently revised its computer plans following the collapse of an ambitious experiment with a sophisticated network of PCs. Production editor Fred Ross says it is now looking at implementing a complete pagination system -- with color, ads and pictures -- in 1993

[14] Costs range from tens of thousands of dollars for a desktop-type system for a small daily to over $1 million for the Harris pagination system at The Globe and Mail

Another factor contributing to caution on the part of the newspapers is the volatility of the computer industry itself. Five Ontario newspapers, for example, own Hastech pagination terminals, manufactured by Crosfield Data Systems Inc. Last year, Crosfield was bought jointly by Dupont and Fuji. The company was divided and its newspaper division sold to Camex, another Dupont subsidiary. Hastech is now part Camex's "traditional products" division, which will continue to manufacture the Hastech equipment as well as other product lines, says Al Weston, business manager for Hastech 2300 products. (Interviewed December, 1990) In the fall of 1990, Camex lost two major clients after changing some other product lines. One U.S. trade magazine said the cancellations "reflect growing apprehension throughout the newspaper industry" about buying new computers "while standards are still evolving and while capital budgets are squeezed by dwindling profits." (NewsInc SpecSheet, November, 1990, p. 1)

Composing room factors: Pagination compresses newspaper production, closing the gap between design and makeup. With the pre-press stage of production moving from the composing room to the news desk, the need for a composing room vanishes.

The prospect of eliminating the composing room has considerable appeal for newspaper managers. The composing room tends to be unionized[15] and as a result, wages for compositors tend to be higher than for many non-unionized newspaper workers.

Many Ontario newspapers have been preparing for the elimination of the composing room ever since the introduction of computerized typesetting in the 1970s. Hiring freezes and attrition policies have been the rule at the larger Ontario dailies for more than a decade.

Nine Ontario editors indicated potential savings in the composing room as key factors in making the decision to switch to pagination. For some newspapers, the purchase of new technology is seen as a way of eliminating jobs. The was particularly important at LeDroit, where 110 production jobs were cut when the new computers went in.[16]

Others newspapers are facing a dilemma: their attrition policies have been so successful that they must re-equip now or begin hiring compositors. Four editors indicated that the number of compositors employed by their newspapers had declined to a critical point. Said the Ottawa Citizen's Scott Honeyman, "we were running out of composing room employees."

Other factors: Ten editors mentioned the potential for time savings or improved efficiency as part of the equation for deciding on pagination. This included the idea that pagination would allow for earlier deadlines and press times, that it would help newspapers meet existing production deadlines, or that it would make the operation more efficient over all.

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[15] The former International Typographical Union, now part of the Communications Workers of America, has contracts with 60 Canadian newspapers.

[16] The change was a last-ditch effort at survival. The newspaper, which had lost $9 million over the previous five years, got rid of its old production staff and building, converted to tabloid format and cut its total staff in half

Seven chain-owned newspapers indicated that any decisions on pagination would be made by the head office of the newspaper chain, based on cost savings. "We had little if any say in the matter," said the editor of one Southam-owned daily.

Only five mentioned giving editors more control over production (and in turn allowing more flexibility in design) as a reason for conversion.

Pagination and Editors

1. Benefits and Drawbacks

Two things are clear: pagination will have strong effects on how editors do their jobs; the work of these is not the prime reason newspapers buy a pagination system. One U.S. editor interviewed by Fowler and Shipman (1988) put the case succinctly: "They buy it; we live with it and use it."

Before discussing what the Ontario editors see as the major benefits or drawbacks of pagination, it is important to understand what pagination means to working editors.

Computerization has tended to have a deskilling effect on newspaper workers, particularly in the production departments

(Smith, 1980). Pagination, however, has had the opposite effect on editors. They still use their traditional "wordsmithing" skills but now must learn a whole new set of skills, many of them technical in nature. Eatherly (1987), writing about editing on VDT, described the impact of computers this way:

> "Now, not only must the copy editor be expert in the language, in the newspaper's geographic area and in the world in general, but he or she must also be computer-adept, a master of typesetting codes, a keyboard virtuoso capable of playing a new and faster tune."

Pagination increases both the volume and the tempo of that tune.

In addition, Eatherly noted that copy editors at computerized newspapers find themselves more confined to their desks:

> "Where, before, an editor might reach for new copy or the phone, get up to grab a dictionary or a pot of glue, toss another wad of paper in the general direction of the waste basket, go talk to an errant editor or writer about some questioned facts in a story, or pick up the paper to see how the story was played yesterday, now he or she sits locked in to the keyboard, peering straight ahead at the screen, producing thousands of keystrokes with little more than fingers and wrists, often disdaining to take breaks away from the all-important terminal."

There is no doubt that pagination tightens the ties between editor and machine. One copy editor at a paginated newspaper in Toronto explained it this way: "It's so very complex that every little thing you want to do takes three or four different steps. ... I found I could not talk to anyone while I was working on the machine. If anyone interrupted me, I resented it." (McKercher, 1989)

Pagination makes the news desk the production centre of the newspaper. When an editor is finished with a page, the page is to all intents and purposes ready to go on the press. Most U.S. editors in a survey reported that pagination saved time overall in the page-production process, and in so doing, saved the company money. (Russial, 1989). Those savings are not found, however, at the copy desk, where the electronic makeup is done. Putting pages together electronically takes an average of 15 minutes a page -- considerably more for open or complicated pages; less for simple, inside pages. In addition, that time is spent on "must-do" functions, many of a technical nature. Says Russial, "a layout editor cannot fail to perform the 10-15-20 or more minutes of keyboarding and graphic manipulation needed to create an electronic page." He found that 44 of 55 editors surveyed reported editorial workload has increased with pagination.

Twenty of the Ontario editors interviewed saw this transfer of responsibility to the news desk as a key benefit of pagination. Page editors no longer have to rely on another department for the final product of their work. They don't have to hang about in the composing room, keeping an eye on pages to make sure that all elements are put on the page, in the right order. Said Lee Ballantyne of the Belleville Intelligencer, "You no longer have to depend on the whims of another department." Terry Shaw of the Sarnia Observer put it this way: "Complete control is in the editor's hands, where it should be." Since copy is edited to fit the allotted space, pagination solves the perennial problem of overset type, or stories that turn out to be too long for the news hole. With pagination, stories are fitted to the space by editors using their wordsmithing skills, not whacked off by compositors wielding an exacto knife. "We've gained some quality control benefits," said production editor Earle Gill of the Toronto Globe and Mail.

Another benefit to pagination cited by the Ontario editors is an improved look to the newspaper. Twelve editors said paginated pages are cleaner, neater and more visually appealing that those assembled by hand. There are no crooked headlines, no ragged vertical or horizontal rules, no boxes that crowd copy on one side and leave too much white space on the other.

Six editors said a major benefit in pagination was that it allows editors more freedom in designing pages. Said Craig Elson of the Cornwall Standard Freeholder, "You can pull a lot of buttons, do a lot of things you've never done before."

Eight cited savings in time as a benefit; seven mentioned cost reduction. "You get a faster, better product, produced more economically," said production editor Fred Ross of the Toronto Star. The result is "a superior visual product with better content."

There is a price to pay, however, for the consolidation of production on the news desk.

Shipman and Fowler's study of copy editors at paginated newspapers in the U.S. found that 88 per cent felt they were responsible for more of the finished product and 78.3 per cent believed their jobs now require more skills. More than half the editors -- 52 per cent -- felt their job is more stressful with pagination than under the previous system.

The editors of several Ontario newspapers are aware of the stressful impact of pagination on their news desks. Nine said the burden the system adds to the news desk is one of the chief drawbacks of pagination.

"It means tremendous stress for the editorial desk," said John Halucha of the Sault Ste. Marie Star, adding that editors now have "many more hours" of work. Said Ken Strachan of the Brantford Expositor, "It's very intensive work, and a lot of it isn't journalistic work; it's composition work." He added that the interaction between computer and editor is very demanding: "it requires your full attention all the time you're doing it." In addition, the system removes some of the safety nets for editors, the compositors who sometimes caught mistakes.

Five editors said a major drawback is that training in pagination is difficult and time-consuming. This is particularly a problem at newspapers using the more complex proprietary systems on the market such as the Harris pagination terminal in use at five Ontario dailies. Learning how to operate the system properly takes up to six months. One publisher said that to operate the system properly, "you have to be a piano player." (McKercher, 1989)

Some of the off-the-shelf desktop layout systems, including Macintosh, are far easier to learn. McDougall said that training at LeDroit took one day a week, for one month.

The drawback most often mentioned by the Ontario editors was the reliability of the equipment. Twelve expressed concerns about whether the systems now on the market will do the jobs they are supposed to do. "It's still untried technology," said Andre Prefontaine of LeDroit. "The system has many bugs. It's a pioneering venture." An editor at a small daily reported losing a page of copy on the day he was interviewed. Others reported problems handling a rush of material on deadline. And one publisher in a small town in the northern part of the province said breakdowns are particularly problematic in remote towns. "You're only as good as your closest repair people," said Bob Ponton of the Kenora Daily Miner and News.

Five of the editors interviewed said they see no drawbacks to pagination technology and are convinced everything will be fine. One declined to comment. One, the editor at a small southern Ontario daily saw the loss of composing room staff as a drawback.

2. Job creation and hiring

Working editors and newspaper managers are both aware that pagination shifts burdens more onto the news desk, and that this can overload the editors. The solution would appear to be simple: if there is more work for the editors to do, then the newspaper may need more editors to do it. The use of VDTs for editing brought about expansions in newspaper copy desks (Carter, 265; Stroud, 68); pagination, the experts agreed, would probably continue the trend.

So far, however, pagination has not brought about any large-scale expansion in Ontario. The survey of the province's dailies found that as of mid-1990, pagination had created a total of 8.5 editing jobs at seven of the 18 dailies using pagination. Editors indicated two other positions may be created, depending on adjustment to the system. Most papers using the equipment reported no increase in desk size due to pagination.

Interestingly, most of the jobs created were at small dailies, with traditionally small news desks. The addition of an editor at the Lindsay Daily Post, for example, doubled the size of the news desk -- from one to two. At another small daily, the Orillia Packet and Times, the hiring of two editors was part of a general expansion in which new technology played a significant role. The situation in Ontario runs counter to the trend mapped by Carter (1984), who found that medium and large newspapers tended to hire proportionally more copy editors than small ones.

Most of the jobs created at Ontario news desks as a result of pagination were permanent. But at the St. Catharines Standard, which accounted for 2.5 of the 8.5 new jobs, two editors were hired on a one-year contract, and a reporter/editor on an indefinite contract. The hiring aimed at helping the paper make the transition to pagination.

This reluctance to expand the size of the news desk seems to relate to the decision to implement pagination in the first place. A publisher who is interested in using technology to reduce the number of employees in the composing room will not be overly enthusiastic about increasing the number of employees in another area. The situation at one mid-sized daily illustrates the point:

newsroom managers at the Kingston Whig-Standard told the publisher that the newspaper would need four more copy editors to handle the extra work involved in pagination. The publisher promised two. But when pagination failed to bring about anticipated savings in the composing room, the publisher withdrew the promise.

The idea that paginated papers need more editors appears to be entrenched, however. Among the 18 newspapers planning to paginate, eight expected they would need more editors. Two expected no changes on the desk. Editors at the other eight said they were unable to make any predictions about whether pagination would create editing jobs. If the experience of the papers that have made the switch is any guide, it seems likely that some of the anticipated desk jobs may not develop.

The survey also found that pagination is influencing hiring decision. So far, there has been some modest "raiding" of editors among the handful of dailies using the Harris pagination system. For newspaper managers, hiring an editor who knows the system saves up to six months of training and break-in time. For job-seeker, technical know-how is an increasingly vital skill.

The emphasis on technical skills raises the fear that newspaper copy desks may become "long on keyboard talent but increasingly short on experience with language and understanding of the multitude of other things a copy editor needs to know." (Eatherly, 1987). Asked to indicate what they looked for in hiring, editors in an AMPE education committee report all cited computer skills. One described the ideal copy editor this way:

> "Someone who is very computer friendly who also can handle news selection and play, layout and design, art selection and who can write heads and cutlines and can backread. They have to be comfortable with computers. They need to love to manipulate elements. Ideally, they are the type of people who now love Pictionary and who played Dungeons and Dragons as kids. They must like strategy and manoeuvres. They need to be bright and able to prioritize, must be highly motivated and able to sit in front of a screen and not get bored. They must be news junkies and love to read." (APME, 1989)

3. The craft of editing

In the final analysis, the job of an editor is to edit. The question of whether pagination will make for better editing is open to some debate.

Shipman and Fowler (1988) sound a disturbing note: asked whether the quality of editing had improved since pagination, 24.5 per cent of the editors they surveyed agreed, and 56.1 disagreed. The 1989 APME education committee report, based on interviews with six editors, concludes "pagination has a strong tendency to change the nature of word editing - for the worse." (Kebbel, 1989) The comments of some of the individual editors are worth noting:

> "Word editing has shifted back to the assigning editors. Wire copy now gets less editing and rewriting. Virtually no rewriting. The concept of a second read on local copy has disappeared. The traditional copy reading function of the copy desk is not being done."

> "It's not as good because pagination is simply another task for the copy editor to do. With pagination, it's easy to fill the newspaper, it's more difficult to edit the newspaper. We're losing the gatekeeper function. We're turning journalists into electronic paste-up people."

Ontario managing editors have mixed opinions on what pagination will mean for the craft of editing. Five said pagination will have no harmful impacts and 12 believe pagination will improve word editing. They offered a number of reasons: some said the consolidation of control in the news desk will stimulate the editor's interest in the pages. Others said the copy fitting requirement will mean better editing, since stories will be edited to fit a space rather than chopped. Some said a natural division will evolve on the desk between editors who are good at pagination and editors who are good wordsmiths. This will "free up" the wordsmiths. Fred Ross of the Toronto Star said pagination will mean that editors will have "more time to do what they do best -- edit."

Seven editors expressed worries that editors might get bogged down in the technology, especially during the early months of pagination. "It's my observation that, in the short term, we're more worried about form than substance," said John Halucha of the Sault Ste. Marie Star. "I think that at this stage it has hurt the craft of editing," said Sheldon MacNeil of the Kingston Whig-Standard. "It shifts the editor's concentration to the layout of the copy, and they consequently spend less time copy editing." A third worried that editors who spend more time working on the computer have less time to work with reporters. This is alienating for both reporters and editors, and potentially damaging to the operation of a newspaper.

Four editors said pagination shifts emphasis toward layout and away from wordsmithing. And three said that with pagination, editors are simply expected to do more. "Pagination will take extra time," said Fred Ross of the Toronto Star. "But the time it will save in the overall production process is 10 times that. Yes, it will involve a transfer of time (to the news desk). A lot of demands will move into the editorial area." He added, however, that he thinks editors will want to do it, since job satisfaction for editors editor lies in having full control over their pages.

4. Pagination and creativity

One of the arguments in favor of pagination, mentioned by some of the Ontario editors and in the trade press, is the idea that pagination allows for more creativity in layout and design. Research questions for this study did not directly address that question, but comments by the editors point to some interesting developments.

The technology allows for virtually unlimited tinkering with design, particularly at newspapers using the Macintosh-type desktop systems. This means an editor can experiment with three or four different looks to a page without having to convince a compositor to pull apart a page and start again. On section fronts, this is particularly appealing. Said Scott Honeyman of the Ottawa Citizen, "you'd have to pry our people away from those Macs."

The idea that the technology frees up creative juices presumes, however, that copy editors are wells of untapped creativity. This is not always the case. Editors, after all, are trained first and foremost to be word people. Some are also good at layout, but not all. Most Ontario dailies using pagination try to train all editors on the equipment, with varying success. "If someone is no good at layout to start with, it's pointless to train them in pagination," said Earle Gill of the Toronto Globe and Mail.

Interestingly, the creativity made possible by the equipment is being accompanied by a push toward standardization, particularly on inside news pages. Many systems have built-in templates to guide layout, and inside pages laid out on pagination systems tend to conform to the most basic of layout principles. The Globe and Mail recently underwent a well-publicized redesign that emphasizes simplicity of layout and elegance of type. The newspaper's new look as a lot to do with the strengths and weaknesses of its Harris pagination system. The redesign strips away some of the fiddly elements of layout -- such as subheads in long columns of type -- which are time consumers for editors. The result is a lean, refined look, but hardly one that enhances the creative instincts of layout editors.

Conclusions

This study has shown that pagination computers are rapidly becoming standard equipment in Ontario daily newspapers. The net effect of this change will be to load more responsibility onto the news desk by giving editors fuller control of the production process.

The introduction of technology has been accompanied by a small growth in the number of copy editing jobs in the province, mainly at the smaller dailies. Most paginated newspapers, however, are operating with the same number of editors as before the technology was introduced. This means that news desk editors are doing more work: in addition to the traditional wordsmithing functions of editing, they are in charge of work formerly done by compositors. It also means that knowledge of computers is increasingly becoming a requirement for editors.

What that will mean in the long run to the job of editor is uncertain. Many Ontario managing editors believe the technology will mean improvements. Others see potential for damage. Some see editing as becoming increasingly specialized, with word editors handling copy and layout specialists designing pages. Others -- especially editors at smaller papers -- see copy editors as people who can and will have to do it all.

Many questions remain about what the new technology means for the news desk editors who must work with it day in and day out. At this point, Ontario newspapers are still undergoing the pangs of making the transition to pagination. The author hopes to conduct further research to look at job satisfaction among working editors and to address some of the many questions raised by a technological change of this magnitude, such as its impact on the quality of editing, the quality of work life, and the training of editors.

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The Role of Telegraphy in the Development of Radio Sportscasting: The Case of Baseball

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The Role of Telegraphy in the Development of Radio Sportscasting: The Case of Baseball

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Although historians have explored the effects of telegraphy on the newspaper, little attention has been given the relationship between telegraphy and radio broadcasting. This article explores the partnership between Western Union telegraphers and radio sportscasters in broadcasting sports event "re-creations." Oral history interviewing is used with 10 Western Union telegraphers and 12 radio sportscasters who participated in this early method of providing "live" away-game coverage. Reasons for the use of telegraphy rather than telephony are explored, including AT&T's expensive licensing requirements and toll circuit charges versus WU's willingness to accommodate broadcast of minor and college league games inexpensively. Western Union's services to broadcasters are detailed. In addition, the equipment and processes of recreation are described, including sportcasters' colorful methods of filling air time doing technical breakdowns in game transmission. Recreation of minor league games continues today, and the reasons for the survival of recreations in the face of newer technologies are discussed.

The Role of Telegraphy in the Development of Radio Sportscasting: The Case of Baseball

Media historians have devoted a substantial amount of attention to the effects of the telegraph on newspaper. The telegraph introduced standardization of news (Carey, 1989, p. 215), changed the prose style used in newspapers (Folkerts and Teeter, 1989, p. 163), stimulated the growth of small town dailies (Emery and Emery, P. 164; Sloan, Stovall, and Startt, 1989, p. 204), led to cooperative newsgathering (Emery and Emery, 1984, p. 164), and helped build the enormous power of a press centered on news for its contents (Tebbel, 1974, p. 203). Media historians have not devoted the same attention to the effects of telegraphy on other media. In particular, telegraphy was closely linked to the development of broadcast programming, and this article explores one aspect of telegraphy's influence on that programming.

The entrepreneurs of early radio were quick to see the value of sports coverage, especially live play-by-play. The necessary technology was slower to arrive at the ballgame. A market for radio sports was developed with home game coverage in the 1920s. But affordable remote broadcasts for away games began to develop only in later decades because of financial blockades created by AT&T and its patent alliance. Radio entrepreneurs filled the gap with a sleight of hand known as "re-creation."

Like live game broadcasts, re-creations were colorful, lively, up-to-the-minute broadcasts of ongoing sports contests--but were provided by announcers who were nowhere near the games. Instead, these announcers broadcast from their home studios, re-creating games using Morse code play-by-play coming in from distant ballfields via Western Union. This technique made continuous coverage of sports teams possible. This in turn helped develop a following among fans and a highly salable programming schedule for radio stations.

This article explores the relationship between two unlikely partners--radio stations all across the U.S. and the then-monolithic Western Union--drawn together by a common seed. This article particularly focuses on the partnership between WU telegraphers and radio sportscasters in providing this early brand of sports news. Baseball coverage is taken as the primary focus for exploration. It is important to examine this neglected genesis of sports reporting now, while some of its early practitioners are still available.

Background

Radio had three primary reasons for entering into the sports re-creations relationship with Western Union. First, WU was extremely flexible in providing telegraphy services. Second, AT&T took a protective stance on broadcast use of telephony, charging high license fees and use rates. And third, the cost of using telegraphy was considerable less expensive than the alternatives.

Western Union retained its monopoly on telegraph services from 1851 (Gabler, 1988) until discontinuing its Commercial News Division on September 9, 1979 (Tom Elcan, personal communication, February 27, 1991). Western Union had also negotiated exclusivity agreements with the major league teams. Hence, the radio station wishing to broadcast major league "away" sports must work through Western Union. In spite of its monopolistic control, Western Union charged nominal fees for receipt of telegraphed game play-by-play; for instance, in 1949, interstate receipt of any National or American League game cost $27.50 (Western Union Telegraph Company, 1949). WU was also willing to set up affordable wire services as needed from minor league and college stadiums.

Telegraphy also was more accessible, more portable, and required less sophisticated transmission lines than telephony.

Unlike Western Union, AT&T was not very accommodating to sports newscasters. Though early telephone circuitry was adequate for voice transmission for broadcast use, AT&T created financial barriers to the use of telephony. Its expensive protective licensing of its broadcasting patents and its high toll charges for broadcasters discouraged use of telephone long distance or "toll" lines. Claiming to have exclusive rights to commercial development of broadcasting, AT&T charged stations $4.00 per watt as a license fee, with a minimum fee of $500 and a maximum of $3,000 (Spence, 1925; Barnouw, 1966, p. 118); if a station refused to pay the licensing fee, AT&T would not provide access to its toll lines (Bloom's Memo No. 4, 1923; Watterson, 1924). Also, many radio stations worked with homemade equipment, which AT&T considered to be a violation of its patents. AT&T's stance led broadcasters to look elsewhere for a source of rapid information transmission--to telegraphy.

Even after telephone technology was made affordable, the costs of travel and time away from the station required for key staff of small radio stations could not easily be passed on to local advertisers (Kerns, 1990). Cost is probably the main reason for the long use of re-creations after technologies arrived that could have made re-creations obsolete.

Literature

Sportscaster Red Barber (1970, pp. 107-111) provides one of the few accounts of re-creation and the broadcasters' reliance on Western Union wire reports, but his reminiscence on the topic is quite brief. The recollections of other sportscasters make even briefer mention of Western Union as a means of delivering information from stadium to studio (Reagan, 1966, pp. 77-79; Coleman, 1973, p. 9; Caray, 1989, pp. 77-82). Moorman's account of the Liberty Broadcasting System (1982) provides a better understanding of Western Union's telegraphy service but in this work, Moorman does not explore the relationships among telegrapher, broadcaster, and technology examined here. Smith (1987), in his overview of baseball broadcasting, devotes some coverage to re-creation and the use of Western Union wire reports (pg. 26-28). But his treatment does not explain in detail how Western Union's service was organized or provide an understanding of the role of the telegrapher in the sportscasting partnership.

Histories of telegraphy and Western Union company focus on the invention of the telegraph and romantic stories of the first continental telegraph line and telegraph use during the Civil War (of., Thompson, 1949). Only Rivise (1950, pp. 154-55), Harlow (1936), and Olson (1941) mention the company's commercial information services, which were the source of sports coverage. Dissemination of sports information is very briefly touched on by Rivise:

> WU [Western Union] is not all work and no play. Rather, it offers play-by-play accounts from the teams of twenty-three leagues in organized baseball. A similar service is maintained for football games, too (pp. 154-55).

A series of articles written and supplied by former Postal Telegraph employee Lewis Coe (1990) of Crown Point, Indiana, provides an understanding of Morse equipment and technological developments in the telegraph industry, but Coe does not mention sports telegraphy.

Contemporary press accounts from 1924 to 1940, the period when Western Union enjoyed dominance in the telegraphic communication industry, make little or no mention of the company's sports reporting services (cf., "A battle on the wires," 1931; "Effects of employment," 1932; Russell, 1943; "Wire merger due," 1943).

Very little attention has been given to sports re-creations or radio's relationship with telegraphy in either the popular or the academic literature.

Method

Through employment of recommended oral history interviewing techniques (Gilb, 1957; White, 1957; Fry, 1961; Dexter, 1970; McCracken, Bronstein, Jenkins, & Quesnel, 1974), in-depth recorded interviews were conducted with former pressbox telegraphers and sports announcers who used such reports for re-creations.

As mentioned earlier, sources on re-creation have become extremely rare. Twenty-two capable narrators were located, in part through references obtained from W.K. Dunbar, president of the Morse Code Clubs of America, an organization of retired telegraph operators. Additional narrators were located through personal contracts in the broadcast industry and through referrals by other narrators. Ten narrators interviewed were former telegraphers and twelve were broadcasters who had first-hand experience re-creating baseball games. Two other potential sources located (including Red Barber) could not participate due to ill health.

Additional information was obtained from items furnished by narrators during the course of interviewing, namely a 1949 Western Union tariff book supplied by W.K Dunbar and two letters from retired pressbox telegraphers. These letters, written to former railroad telegrapher Bill Davis of Prairie Village, Kansas, describe the process of sending game details by Morse code to subscribing stations.

Results

Western Union's Services

Prior to the 1920s, when other forms of wire communication were developed, Western Union held a virtual monopoly on immediate information transmissions, including accounts from the scene of any distant news event (Grumbine, 1990). News-gathering organizations such as the Associated Press and United Press International were also dependent on WU to carry their news dispatches to subscribers (Smith, 1990). businesses, too, employed telegraph operators to keep in constant contact with critical trade centers (Grumbine, 1990).

Western Union also offered its own news and market information services through a Commercial News Department (CND), headquartered in Chicago (W.K. Dunbar, personal communication, September 14, 1989). Subscribers could receive CND services on ticker (paper) tape, by telegram, or through a direct and constant circuit to a receiving telegraph operator. Subscribers wishing to receive only specific commodity or other information could arrange to have it delivered by messenger. A popular service was one for receiving continuous play-by-play accounts of sports games (notably baseball, football, basketball, and hockey) fed directly from the scene of the event to the subscriber's establishment.

The diversity of information gathered for the Commercial News Department at WU allowed for a wide range of potential clients, including advertising agencies, billiard halls and cigar stands, brokers, boards of trade, department stores, drug stores, restaurants, sporting goods houses, hotels, and even college fraternities ("Western Union Telegraph Company," 1949). Baseball and football stadiums used the sports ticker service to announce the scores of other ongoing games (Moorman, 1990), and newspapers and radio stations were primary customers of both the business and sports services.

Western Union does not have record of the start-up date of its Commercial News Department (Don Dutcher, personal communication, March 27, 1990), but newspapers were receiving telegraphed sports play-by-play well before the advent of radio (R.K. White, personal communication, March 31, 1990). This service was known as "Paragraph One," so named because the first paragraph of FCC Tariff 216 summarized the conditions and rates allowable for wire delivery of sports play-by-play. Tariff 216 outlined rates for eight separate baseball services, such as reports every half-inning (Paragraph Two) or at the end of each inning (Paragraph Three). Paragraphs 20 to 23 covered reporting of football, basketball, and hockey ("Western Union Telegraph Company," 1949).

Western Union assured its monopoly in baseball reporting by negotiating with major league baseball organizations for exclusive ballpark telegraphy rights (Barber, 1970), but accommodated customers with a variety of special sports-related services. For instance, while Western Union generally provided a telegrapher sending straight play-by-play for most college and league games, a newspaper might also arrange a special exclusive circuit. Over this circuit, the WU telegrapher would send stories written by the newspaper's own reporter from the pressbox directly to the newsroom, where another telegrapher would translate the stories from code to English (Moorman, 1990). If a stadium, college fieldhouse, or other athletic facility did not have a Western Union circuit, the company would install a special connection, making Paragraph One service available from any minor league or college sports event. Western Union provided subscribing radio stations with operators to receive and translate incoming game messages for announcers.

Radio entrepreneurs quickly perceived that sports news would draw a large audience (Rader, 1984, p. 28). Home games provided lively play-by-play, but airing road games was too expensive and technically awkward. In addition to the barrier of AT&T's licensing and toll line expenses, discussed earlier, the telephone technology required a dedicated circuit, "equalized" telephone circuitry, amplification at various points along the connection, and "phase equalization" to assure that high and low frequency sounds arrived simultaneously at the other end of the wire (Alten, 1986; Morris, 1988; Sibley, 1988; Todd Hoover, personal communication, February 27, 1991; Lux, 1991). Broadcasting live from a stadium also required bulky equipment (Stucki, 1991); in addition to the microphone, a remote amplifier (about four feet tall and housed in a heavy oak cabinet [Morris, 1988]) and a power supply, often heavy batteries, were required.

Western Union's Paragraph One telegraphy service was a ready answer: it provided complete, accurate accounts of games, instantaneously transmitted, and was far less costly than sending a sports announcer on the road with the necessary equipment. In the absence of any alternative live service, this form of access to ongoing games met with approval from the fans.

Re-creation Equipment

From Morse's 1837 invention of the telegraph through the late 1920s, telegraph technology changed very little. A sending key was used to create the dots and dashes picked up by a receiving apparatus that punched the code onto paper tape. Morse operators quickly learned they could effectively "read" messages just by listening to the incoming code. Paper tape was soon replaced by a "sounder," a brass tubing device that sounded out incoming code (Coe, 1971).

Morse operators welcomed innovations that might increase their efficiency. One was the "bug," invented at the turn of the century by Vibraplex company and deriving its name from the manufacturer's logo, a lightning bug, pictured on it. The bug was a semiautomatic sending device that allowed for speedier transmissions (Langdoc, 1990). Dots were made by pressing its key to the right, dashes by pressing to the left (Russell, 1943).

Glenn Winters of Williamsburg, VA, who worked his way through college as a pressbox telegrapher, explained how the bug made code transmission faster:

> To make the letter "p" in Morse code, you have to send five dots..... With a [standard] key, you would have to send "dot-dot-dot-dot-dot." With the bug, you just press [down on the key] until it's gone five times. That's a great deal faster (G. Winters, 1990).

Another innovation that speeded transmission was an abbreviated form of code developed in 1879 by newspaper telegrapher Walter

Phillips. Phillips created short-cut code for nearly 6,000 common terms (Davis, 1954)). Telegraphers fluent in Phillips code could transmit enormous amounts of copy in a matter of minutes. (Baseball telegraphers also invented their own game shorthand, described in an upcoming section.)

As society became more industrialized, Morse technology, shorthand or no, could not keep up with the demand for instant communication (Coe, 1990). The teleprinter was the technology that would replace telegraphy. Made operable in 1910 ("Typewriter Prints Wire Messages," 1910), teleprinter technology was first used commercially by the Associated Press in 1915 to simultaneously transmit news to all its New York subscribers (Bloom, 1956). The teleprinter was not developed adequately for widespread use until the late 1920s (Davis, 1954), and even then, technical problems required a decade of ironing-out to make the teleprinter the messaging equipment of choice. By 1931, though, partially due to American Telephone and Telegraph's entry into the teleprinter messaging business, Western Union and Postal Telegraph had also begun to offer teleprinter services to their customers ("A Battle on the Wires," 1931).

The teleprinter put into service in the early 1930s printed incoming messages on a strip of paper about one-half inch wide. The machine had a keyboard similar to a typewriter, making each teleprinter both a sending a receiving device. Sending messages required beyond typing skill.

Where Morse operations were dependent on the speed and skill of the two operators at sending and receiving stations, teleprinters were not, and this technology in the 1930s could transmit with greater overall speed.

Technical difficulties with the teleprinter slowed its adoption in spit of the ease of finding typists to operate the machine. Coe (1990) suggests that the slow diffusion of this technology was tied to frequency variations in the power provided by electric companies in this era. for the teleprinter to operate successfully, the electric motors of both the transmitter and receiver had to operate at the same speed. Standardized electricity generation at 60 cycles per second was not adopted nationwide until several years after the teleprinter was introduced commercially.

Morse technology lingered long after the teleprinter's competing--and apparently better--technology was introduced, primarily due to Morse's flexibility. The Morse equipment did not depend upon electricity, nor did it require a very high quality transmission line. The equipment was lightweight and portable. Using Morse, Western Union could continue to offer Paragraph One coverage to subscribers at locations where teleprinter technology was not feasible (Coe, 1990). For many years after the widespread adoption of the teleprinter, Morse equipment was still used as a backup case the newer technology failed (Langdoc, 1990).

Re-creation Process

Two philosophies existed about the re-creation process. One group of broadcasters sought to make the games as realistic as possible, complete with crowd noises, the crack of the bat against the ball, the sound of vendors selling hotdogs in the stands, and periodic announcements over the public address system (Murrah, 1981; Nelson, 1989; Hedrick, 1990), felt it was wring to let listeners believe the game was coming live from the park. Moorman (1990) recalled that Barber attempted to add crowd noise to his broadcasts only once. Barber made it a policy to tell his listeners many times during a game broadcast that the game was being described from a Western Union wire report.

Former Western Union telegrapher Harry Moorman (1990) provided a description of the typical re-creation process. He worked in the 1930s, receiving Morse accounts of Cincinnati Reds roads games in the studios of station WSAI, where he translated incoming code for sportscasters Red Barber. Moorman recalls that he worked form a small table, just bug enough for his typewriter and telegraph key. Barber would stand over the telegrapher's left shoulder, reading Moorman's typewritten messages as Moorman picked up more details of the game over the "sounder". Barber used a music stand to hold the many notes he made to himself regarding team and player statistics.

Moorman was careful to keep the clatter of the sounder out of range of Barber's microphone. He noted that otherwise, if a "Morse man" was among the listeners, he might "make a quick bet" on what was about to happen in the game "and would never fail to be paid off, having heard the play in Morse before it was announced" (Moorman, 1982).

The notes Moorman and other studio telegraphers typed up in "English" from incoming Morse code were extremely cryptic, as telegraphers had devised their own abbreviations to speed up their game transmissions. S.M. "Tibbs" Hammonds, of Joplin, Missouri, who spent much of his career sending and receiving Paragraph One accounts of Missouri and Kansas minor league baseball, reconstructed a typical sequence of batting action as it might have been sent in Morse code:

```
JAMES UP--BATS LEFT
B1  LO OS
S1  C
S2  S
B2  Hi IS
F1  BACK TO RF FENCE
B3  LOW IN DIRT
S3 C.
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From such information, the sports announcer would know about the batter's stance and what direction that ball would go if the batter managed a hit. "B1" meant the "ball one" was called by the umpire, while "LO OS" meant the ball was low and outside. The designation "S1 C" simply meant strike one was called, while "S2 S" meant the batter swung at the ball for his second strike (S.M. Hammonds, personal communication to W.B. Davis, 1985).

Each receiving telegrapher at a radio station had a key that allowed return communication to the sending pressbox operator, if any incoming information was missed. Teamwork was so strong between operator and announcer that sometimes an operator would already be requesting more information, "breaking in with his own key" (Davis, 1984), before the announcer signaled the need.

As Red Barber pointed out (1970, p.108), for most games, with only a few stations connected to the circuit, all the operators receiving the game could occasionally ask for clarification without causing a break in the flow of the game. If a greater number of stations were connected, the situation could become chaotic:

> On a big game with many points hooked together, the sending operator at the ball park would get furious if stations began breaking in on him...and so would I, standing in an empty studio, waiting for a play while some guy in Iowas chatted away, to be followed by a fellow in Alabama asking for a repeat, and then a man from Indiana would break in (Barber, 1970, p. 108).

Sportscaster Dev Nelson of Manhattan, Kansas, who re-created games for the minor league Topeka Hawks in the 1940s, recalled that the sending telegrapher's knowledge of baseball could greatly influence the quality of reports coming from the game. For example, if the operator sent only "FLY BALL", the announcer would have to speculate on its direction, based on the batter's stance, right- or left-handedness, and wind direction. But if the sending telegrapher knew baseball, the incoming message might read "FLY BALL TO GAP IN LEFT CENTER", leaving little question as to where the ball was hit (Nelson, 1989).

Tom Hedrick of Lawrence, Kansas, who followed Nelson as the Topeka team's announcer in the early 1960s, recalled that it was typical for the pressbox telegrapher to send vital information before each game that would greatly affect how the announcer would describe the ensuing game in the re-creation:

> If the game started at 7:30, he'd be there at 7:00. He'd send "Weather in Des Moines, Iowa, tonight: 70 degrees and overcast. Crowd of about 750... Line-ups to follow." Then would come the line-ups. There would be a pause. And, finally, the play-by-play (Hendrick, 1990).

For the sportscasters like Red Barber, who continually reminded listeners of the reconstructed nature of the game, sudden interruptions in service could easily be explained as technical difficulties (Barber, 1970, p.108). For the announcer who insisted on realism, however, such delays in communication were part of the fun and challenge of doing re-creation. Breakdowns in service were often dealt with through elaborate fabrications. Tom Hedrick's (1990) recollection of a teletype machine breakdown that interrupted a Paragraph One baseball game account shows the panic-stricken reaction of broadcasters to such a situation:

> One night we [Topeka] were playing Green Bay, Wisconsin... In the eighth or ninth inning,...the kid [helping with the broadcast by bringing in Western Union updates]...came back and his face was ashen.
>
> I told my listeners, 'We'll be right back after this." So we ran some commercials and I said, "What's wrong?"
>
> He says, "The damned spring on the teletype machine is broken!"...
>
> I said, "You get on the phone right now and call the ballpark. I'm either going to announce a rain delay or a helluva fight. You get on there and find out if you can--at least get the final score!"
>
> Well, somebody was cleaning up in the pressbox. Everybody had gone. So all I could do was get the final score, and the guy read me the line score off the scoreboard... I got the Topeka Daily Capital the next morning at 5:30. I was one hitter off!"

Sportscaster Lindsey Nelson (1966) wrote that he once stalled a considerable period by announcing that the pitcher was continually reaching down to tie his shoelace. Then, to stall for more time, Nelson described the batter as hitting 15 foul balls before the line trouble was remedied. Veteran broadcaster Gordon McLendon revealed in an interview that his favorite stalling device was to describe a dog loose on the field, so that "there would be long chases where this dog was being pursued by various policemen and some of the players would be involved" (McLendon, 1971). Sportscaster Ken Coleman (1973) recalled that many broadcasters would use "a sudden and inexplicable rain shower" to stall for time.

Usually, these service interruptions were due to a broken connection in the circuit between the pressbox and the radio station. Such disconnects could be as simple as a wire kicked loose in the pressbox or a complex as a transmission line downed in a storm (White, 1990). Moorman recalled that he experienced trouble with Morse equipment only once, during a Cincinnati Reds game, when he spilled Coca-Cola on his sending key:

> The last I had heard [prior to the accident] a fellow...was out, which was the second out, and the next batter up...instead of hearing [how he did at bat there was full two minutes of nothing coming over the wire. All of a sudden I heard the message "NTG AX" [the abbreviation for "no runs, no hits, no errors"]. I know the inning was over, but I didn't know how the third out occurred. So I tried to send [to the pressbox operator to find out how the third out occurred], but my key was shorted out and I couldn't send. So there was nothing I could do about it so I faked it...I typed [for Red Barber] "Riggs fly to left," because I knew he didn't score a run since the inning ended with no runs, hits, or error. Then I got my handkerchief out and, between the next few plays, I wiped the key off, took a dime out of my pocket and opened the contacts and scraped the with the dime. Then I could send again. I didn't tell Red Barber about that until many years later. That night in the paper I read that the player actually did hit a fly, but it was to the right. So I didn't miss it by much (Moorman, 1990).

End of Re-creation

The ready availability of new and better technologies for transmitting live sports news did not spell the end of telegraphed and re-created games. Introduction of the teleprinter, for example, did not bring an immediate end to game accounts in Morse code. The availability of inexpensive high quality voice transmission lines did not lead stations to abandon re-creations immediately, either. Indeed, the development and 30-year span of live-action television broadcasts has not completely ended the use of re-creations in radio.

The need for Morse accounts of games should have ended by 1930, with the widespread availability of the teleprinter--but didn't. Morse operators were still used in many pressboxes in the 1940s. Moorman (1990) recalls Morse being sent from the Cincinnati pressbox as late as 1955, just a Cecil Langdoc (1990) remembers that teleprinters did not replace telegraphy in the pressbox at Notre Dame until the mid-1950s. The changeover from telegraphy to teleprinters was gradual, as it was in Western Union telegram offices.

Most stations had discontinued re-creations of major league games before the 1950s, and of minor league games by the mid- to late 1960s. Television had created a new demand for immediacy and realism, at the same time that fans became more sophisticated and critical of information quality. No more would they accept the fabrication of 15 foul balls while a sports announcer stalled until Western Union service could be restored (Nelson, 1989). As transportation improved, sending announcers to distant stadium was no longer the time-consuming burden it once had been. Telephone lines were more affordable. And the audience's appetite for sports was clearly visible to advertisers, so that higher advertising rates could be charged for commercials in away-game broadcasts (Kearns, 1990).

One of the greatest surprises of this research has been the discovery that re-creation, in spite of its seeming antiquity, has been used for coverage of minor league baseball teams long past the period when this production technology was assumed to have been obsolete.

In fact, the Tacoma Tigers of the Pacific Coast minor league conference re-created their full component of road games in the 1990-91 season. Using modern broadcast production technology, announcer Bob Robertson described the action from the comfort of the studios of KTAC Radio, as the Tigers played in such ballparks as Colorado Springs, Albuquerque, Las Vegas, and Tucson.

The technology of re-creation is somewhat changed. No longer does a Western Union wire report clack out the game's vital statistics. In the place of telegraphy, Robertson relies on periodic telephone calls to the distant ballpark as a means of collecting information. Also gone are the homemade sound effects: striking a wooden object with a pencil to simulate the crack of bat against ball, crowd noise records, or a fellow announcer talking into a reverberant trash can to simulate public address system. These have been replaced by table recordings of ballpark sounds from each stadium in the Pacific Coast League, which Robertson collected himself for use in his re-creations.

Discussion

Sports re-creations created an unusual relationship between small news organizations and a communication monolith. It required the employees of the enormous Western Union to adapt to the needs of the radio industry in its infancy. The re-creation practice helped create the customs and styles of sports broadcasting today.

Reliance upon the telegraph by the broadcast industry has been largely overlooked by media historians. This research has shown the nature of the relationship of telegraphy and early baseball sports news. Future research should explore the relationship of broadcast news to telegraphy further. Market news remains an unexamined area, as do the various other sports that joined baseball on the airwaves. Another key area for research is the competition between Western Union's own news-dissemination division and the nascent press associations in gathering and selling hard news stories. And finally, the re-creations studied here require more attention: what were the ethical considerations in choosing to re-create games with sound effects? what were the station economics that prompted re-creation? who were the announcers who did re-creations?

Western Union's Commercial News Department--and the many types of information services it provided, including Paragraph One--was a major

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